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A WEEKLY SOUTHERN INDUSTRIAL, RAILROAD AND FINANCIAL NEWSPAPER

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Manufacturers' Record.

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BALTIMORE, JANUARY 2, 1908.

FOR CONSERVATISM.

Mr. Leland Hume, general manager Cumberland Telephone & Telegraph Co., Nashville, Tenn., writes to the MANUFACTURERS' RECORD as follows:

Many of the strong articles that have appeared recently in your publication have been read by me with interest and approval, but none that has attracted me more than the editorial in your edition of the 5th, entitled "The Call to the Conservative South." The article has the true ring about it, and if our section is to come into its own and hold its place in the commercial life of the nation, our people must act in that same manner that your editorial so forcefully pictures. I am satisfied that the Nashville Board of Trade will endorse all that you have had on this subject.

Complementary to this is a letter to the MANUFACTURERS' RECORD from Mr. E. S. Shannon, secretary of the Nashville Board of Trade. He writes:

Your paper has played a conspicuous as well as important part in the upbuilding of the South. It is a pleasure to say I have been a constant reader of the MANUFACTURERS' RECORD for years, and will continue as long as I have the price to pay for same. The strength of Gibraltar is nothing in comparison with the real, solid strength put forth by you and your people in your strong stand for the South and her possibilities. I concede you to be conservative, and if we will be governed and follow closely the many suggestions and advice set forth in your valuable paper the South will continue on her substantial growth, because her factories produce, her people progress and all her natural resources make her productive. In conclusion, I wish to say that the Nashville Board of Trade, with a membership exceeding 2000, wants to thank you for the space allotted to expounding the happenings throughout Nashville and her territory, and I wish to state that we have enjoyed a year of prosperity. We appreciate your efforts and co-operation toward a continuance of such privileges, and our best wishes are that your efforts have proven dividend pleasing.

Mr. J. B. Garvin, Charleston, W. Va., secretary of the West Virginia Board of Agriculture, writes to the MANUFACTURERS' RECORD as follows:

So impressed am I with the scope and value of the reading matter contained in every number of the MANUFACTURERS' RECORD that I feel it a duty to compliment the management. It is certainly a great force in the commercial world. The various subjects are comprehensibly treated and touch the very fiber and pulsations of our commercial being. One article in particular in the MANUFACTURERS' RECORD of December 26 appealed to me most forcibly. It was headed "On Earth, Peace, Good-Will to Men." This is the most sane, sensible, philosophical presentation of the true condition of things and the disposition of mankind generally I have read since the beginning of the present stringency in business.

MISTAKEN ZEAL.

Some well-meaning beings connected with a quasi-religious organization hung several bags in different parts of an Alabama town just before Christmas for the reception of gifts to be distributed among "the poor people of the cotton-mill district of the town." The aforesaid "poor people" resented this unintended impertinence and placed alongside the begging bags at the postoffice the following notice:

We, the poor people of the cotton-mill district, take pleasure in expressing our feelings in regard to the charitable deeds that are being gotten up for the benefit of the poor people of the cotton-mill district.

We are pleased to say we are working for the Union Springs Cotton Mill Co. and are not on the people of the town, and do not think it necessary for the people to burden themselves with the poor people of the cotton-mill district unless called on for aid.

Perhaps if the members of divers quasi-religious organizations should inquire of "the poor people of the cotton-mill district" in many Southern towns whether their aid is needed in other respects, they might not follow unquestioningly in the train of social uplifters whose salaries are dependent upon agitation of the question of conditions of cotton-mill people.

JUNGLE JOBS.

Mr. C. O. Bartlett, president of the C. O. Bartlett & Snow Co., Cleveland, Ohio, writes to the MANUFACTURERS' RECORD:

I wish to thank you for your editorial in the issue of December 12, entitled "Shaving Shovels." There is no question whatever but what a large number of the American people are trying in many ways to shirk obligations. Not only among the fellows who shovel, but, if anything, more among the well-educated young men who are working in offices as clerks, and especially many graduates of high schools and colleges. There seems to be a sort of a feeling among this class that the world owes them a living, that they do not propose to do honest labor, and that through their ability they can get along without it. It is a very bad sign indeed. Instead of trying to shirk, it is the duty of everyone to do all he can to help matters along. Honest labor is something that everybody should be willing, and not only willing, but glad, to do. It is one of the laws of God, and cannot be otherwise. Those who wish to live without work might better go to the jungles of Africa and live as the people do there, where it is not necessary to have good food, not necessary to have good roads, not necessary to have good houses, not necessary to have railroads or bridges or anything of the kind.

If man had not been turned out of Eden, perhaps he might never have had to work for a living. In that event, it is quite likely that the world would have remained pretty much of a jungle. It is quite probable that the idea of a curse being attached to making one's bread by the sweat of one's brow was an evolution from the disinclination to dig on the part of the fellows who had been accustomed to having their food drop from the trees into their mouths. But, in spite of the constant pull toward the jungle, man has been steadily advancing toward the point where he will work for the joy of working. As that new Eden is neared, as muscle becomes of secondary importance to mind in subduing and utilizing the forces of nature for the sake of humanity, the words toil and labor become obsolete, and the word work is spelled in golden letters. It cannot be denied that, as Mr. Bartlett points out, there is an inclination on the part of too many of the rising generation to shirk physical or mental exertion, to refuse to do the duties that give them the right to walk about on their hind legs. But that regrettable manifestation is but a passing phase of our civilization originating in a false education that has trained men and women to try to live by their wits instead of by their intellects. Victims of that false education, the seekers for jungle jobs, must ultimately find their place in nature, and that place will be the desert of starvation.

AN INSPIRATION FOR THE COUNTRY.

As an inspiration for the country as it enters the new year the MANUFACTURERS' RECORD publishes in this issue a number of special articles by well-known authorities and students bearing upon the opportunities before the people of the United States. The articles include:

"The Land of Unlimited Possibilities."

"Has Never Sold the United States Short," by Charles A. Moore of Manning, Maxwell & Moore of New York.

"The Necessity for Railway Expansion in the South," by President W. W. Finley of the Southern Railway.

"As the Forty-Sixth State Enters the New Year," by F. M. Posegate of Oklahoma.

"Vast Profits in the By-Products of Oil Production," by Albert Phenis.

"The Iron Trade of the World," by J. Stephen Jeans, secretary of the British Iron Trade Association.

An interview with Charles Catlett, the eminent geologist, on Alabama iron, by Thomas P. Grasty.

"Mineral Resources of Oklahoma," petroleum and gas, by Charles N. Gould, professor of geology in Oklahoma State University.

"Louisiana's Domination of the World's Sulphur Trade," by Albert Phenis.

An interview with Secretary James Wilson of the National Department of Agriculture on the outlook for agriculture.

"The Tour of the European Spinners in the South," a review by M. V. Richards of the land and industrial department of the Southern Railway.

"Millions of Money in Draining Swamp Lands," by Edward Wisner of New Orleans.

"Forest Perpetuation in Its Relation to Southern Water-Powers," by John H. Finney of Atlanta, secretary of the Appalachian Forest Association.

"Coal and Timber Activities in West Virginia," by Albert Phenis.

"Immigration Opportunities of the South," by F. H. LaBaume, agricultural and industrial agent Norfolk & Western Railway.

"Various and Increasing Uses of Cement," by William H. Stone.

These special articles occupy a goodly portion of the 180 pages of this week's issue of the MANUFACTURERS' RECORD, and will appeal to a wide reading public who are interested in the future of this country. Equally interesting and inspiring are the advertisements, varied and of wide range, of many corporations, firms and individuals actively participant on many lines in the material advance of the country. These advertisements fill 140 pages of this paper, and are striking evidences of faith in the possibilities of the country and of determination to share in the benefits of their realization.

SOUTHERN FOREST RESERVE.

If a lively, vigorous public opinion urging the establishing of a national forest reserve in the Southern Appalachians is not speedily organized it will not be the fault of the recently-formed Appalachian National Forest Association, with headquarters at Atlanta, Ga. The secretary of the association, Mr. John H. Finney, informs the MANUFACTURERS' RECORD that it is planned to hold at Atlanta about the middle of this month, under the auspices of the American Institute of Electrical Engineers, the Appalachian National Forest Association and other bodies, a rousing meeting for the purpose of crystallizing opinion on the subject and of insuring a large and active attendance in Washington at the hearing on the measure establishing the reserve. Governor Hoke Smith has promised to preside at the Atlanta meeting, and prominent speakers will be asked to present certain phases of the subject, such as "Water Supply and Navigation," "Importance to the South of Water Power," "Forest Functions and Perpetuation" and the "Plan of Action." Secretary Finney has sent to commer-

cial bodies of the South a letter urging that they adopt resolutions in favor of the measure and co-operate in every other way for its furtherance. He is also circulating the following statement showing the importance of the Southern forests and the necessity for their perpetuation:

The Appalachian range, extending from North Georgia to New England, contains 75,000,000 acres of ground, on which hardwood trees are growing or can be made to grow as an agricultural crop.

It is our only remaining source of hardwood supply, and at the present rate of cutting will be exhausted in 16 years.

The Appalachians are the source of all the important Southern streams, and the forest covering is of vital importance to them in their supply of water and evenness of flow.

It is estimated that the South has 3,000,000 horse-power in these streams, worth yearly, when developed, $60,000,000, meaning an investment in the South of $300,000,000, saving $15,000,000 to $20,000,000 yearly on our coal bill. We have but made a beginning in this development.

Twenty per cent. of our forests is already cut, and its effect is shown in longer and more frequent and more damaging flood periods ($18,000,000 damage in one year in the South alone), and longer low-water periods in the summer months.

This condition has already cut down our estimated power largely (estimated by 40 per cent.), and constitutes a serious and real menace to our water-power and to the water supply of our cities and towns.

Our streams are rapidly filling with sand, silt and detritus, and navigation of our important streams is threatened.

Larger and more costly dredging operations are yearly required to keep our navigable streams open, and it has been stated that the sums we shall soon be compelled to spend yearly on dredging, harbor works, jetties, etc., will pay the entire cost of the proposed national forest.

Forest perpetuation under national forest laws means "perpetuation through use." Trees are cut under proper methods, planted and raised under scientific directions, and the proposed national forest in the Appalachians would mean not only a perpetual supply of timber, but a freedom from most of the evils that a continuance of present methods must inevitably bring upon us.

Forest perpetuation is practical, sane, profitable in actual returns on the money invested, and the results cannot be questioned.

It is of supreme importance to the entire South, and to its support there should be rallied the aggressive work and aid of the whole South.

Upon our forests depends in a larger measure than most people realize the future of the South.

Let it not be said that we are unappreciative of or indifferent to the opportunity to do our whole duty in demanding the conservation of this splendid asset of our Fatherland.

THE INCUBUS UPON RAILROAD WORK.

In the preparation of its annual review of railroad construction in the South, which was published last week by the MANUFACTURERS' RECORD, two notable facts became prominent, one of which was that, notwithstanding business and other disturbances affecting the companies throughout practically the whole of the past year, the total amount of new line built in 1907 was just about the same as in 1906, the other being that but for the manifested antagonism toward railroad enterprises and the late panic there would have been a large increase in the amount of construction projected for the year 1908. As matters stand, there has been a great falling off in the total of proposed railroad building as compared with the review of a twelvemonth ago, and it is probable that little new work will be started this year, the disposition of capital being to await the outcome of the Presidential campaign and its outline of Federal administrative policies, as well as developments respecting the attitude of State Legislatures, before undertaking anything new.

A number of letters received from officials contained, with reference to the new year's possible undertakings, remarks such as these: "This extension will not be built unless present conditions improve and the antagonistic sentiment of the South toward railroads has a decided change." "This construction has been indefinitely deferred, owing to the general hostilities manifested against all corporations, good and bad, and the hesitation of investors, both domestic and foreign, to advance money to railroads under such conditions." "Plans are necessarily held up on account of present financial stringency and general conditions adverse to railroad building." These quotations are only a few of those received commenting upon the situation. To give in detail all of the railroad plans deferred as heard of would demand more space than could be spared for the subject, but it can safely be said that at least 75 per cent. of the new construction projected is halting principally because of harsh legislation rather than on account of the panic. The money difficulties are gradually disappearing, but there is as yet little sign of a more temperate attitude among legislators toward the transportation companies.

Had it not been that a large amount of construction was so far advanced that it could not be stopped without heavy loss the record of new line built in 1907 would most certainly have shown a heavy decrease as compared with 1906. The panic, however, capped the climax of the railroads' troubles and compelled cessation of much extension and betterment work, as well as enforcing indefinite postponement for similar plans not started.

Another result of the anti-railroad movement, or rather the restrictive legislation aimed at railroads, is that the people, the patrons of the common carriers, will suffer. Double-tracking, which means greater safety and speed, is checked; the instalment of block signals is halted; the building of better stations is deferred—a great variety of work designed to secure better and more comfortable operation is postponed, to be taken up none know when. Engineering departments are mostly at a loss to say what will be done this year.

"COTTON FACTS."

Another edition, that for 1907, of Col. Alfred B. Shepperson's invaluable annual, "Cotton Facts," has appeared, and will be welcomed by everybody interested in the far-reaching phases of cotton. In addition to bringing to the latest dates, even in some instances to November 22, the essential statistics and other information respecting the yield, movement and consumption of cotton in the United States and other countries for a series of years, this edition has a number of new features, including an article by George Otis Draper of Hopedale, Mass., on the "Labor Problem of the American Cotton Mills;" an authentic account of the "future delivery" business in New York, Liverpool and New Orleans since its inception; a table showing at a glance the salient features of production, consumption, etc., for the past 10 seasons; weekly prices of "future deliveries" in Liverpool for the last two seasons; the various reports of "ginning" issued by Census Office since 1903; a map showing the exact territory infested by the Mexican cotton-boll weevil each season since 1904; a full account of the persons who formulated each estimate of the Department of Agriculture respecting cotton since December, 1906, and an illustration showing the degrees of temperature indicated by the Farenheit thermometer, with their equivalents by the Reamur and centigrade thermometers.

WHITNEY COMPANY'S PURPOSE.

Messrs. A. O. Brown & Co. of New York, who have recently acquired control of the water-power developpment at Whitney, N. C., write to the MANUFACTURERS' RECORD as follows:

"On the first day of next July there will occur at the town of Whitney, on the Yadkin river in Stanly county, North Carolina, one of the greatest moves in the industrial development of the South. On that date the Whitney Company aims to begin distribution from its great development plant there of electricity to move the machinery in various manufacturing establishments within a radius of 80 miles.

"Work on the massive granite dam at Whitney was begun in February, 1905. The work now is in the final stages. Built throughout of granite taken from the Whitney Company's own quarries, with each block bedded in Portland cement, the structure stands as one of the greatest pieces of engineering of its kind in the world. The length of the dam between abutments is 1000 feet. It towers 38 feet above the river bed, with a width at base of 58 feet and width at crest of 12 feet. It is designed to withstand a flow of 200,000 cubic feet per second, which is equal to a flow of 15 feet over the crest of the dam. Also there is a spillway, which is really a continuation of the dam intended to protect the power canal on the river side. This also is constructed entirely of granite and Portland cement.

"The canal is four and a half miles in length, with an average width at surface of water of 112 feet and a minimum depth of water of 18 feet. Its capacity is 3300 cubic feet per second, with a head or fall available at the turbines of 129 feet. The power-house is a structure about 600 feet long, 120 feet wide and 100 feet high. Six turbines will be used of 9000 mechanical horse-power each, developing in all 54,000 horse-power.

"The Whitney Company owns the land on both sides of the river for several miles above and below the present dam. A few miles below the site of the present power-house, according to completed plans of the Whitney Company's engineers, another great dam will be built, giving an additional development of 37,000 horse-power. The company also owns about 25,000 horse-power above the dam which can be developed when necessary, making a total development of 110,000 horse-power or more.

"For all of this power there is an immediate market in the territory traversed by the Whitney Company's transmission lines, and the demand for electricity in this field is growing at a rate much faster than the Whitney Company will be able to keep pace with.

"On the first of the year the force of men employed on the construction work will be greatly increased and the work will be pushed to completion as fast as possible. Undoubtedly it would be safe for the company to promise commercial power earlier than the date set, July 1, but to guard against all possible contingencies it has been deemed advisable to allow ample time margin in its announcements."

INHARMONIOUS.

In view of the rather definite estimate of December 30 that in New York city alone there were 125,000 persons without employment, a number from three to four times as large as it usually is at this season, it might be well for some definite facts to be produced revealing the basis for the somewhat generalizing statement of December 28 from the wonderful division of information of the National Bureau of Information that within the last 10 days there has been a renewal of the demand for labor in the country.

THE COTTON MOVEMENT.

In his report for December 20 Col. Henry G. Hester, secretary of the New Orleans Cotton Exchange, shows that the amount of cotton brought into sight during 111 days of the present season was 5,995,384 bales, a decrease under the same period last season of 1,324,891 bales. The exports were 3,309,532 bales, a decrease of 337,641 bales. The takings were, by Northern spinners, 663,147 bales, a decrease of 347,278 bales; by Southern spinners, 895,964 bales, a decrease of 15,743 bales.

In the 118 days of the present season up to December 27 the amount brought into sight was 6,426,409 bales, a decrease under the same period last year of 1,328,147 bales. The exports were 3,572,881, a decrease of 372,379 bales. The takings were, by Northern spinners 691,655 bales, a decrease of 416,526 bales; by Southern spinners 952,072 bales, a decrease of 19,043 bales.

HAMPTON ROADS.

Mr. Walter Sharp, who is active for everything in the interest of Norfolk, writes to the *Ledger-Dispatch* of that city that there has not been sufficient energies given to the importance of his section in the selection of Hampton Roads as the only available place to anchor the aggregation of warships that sailed last month for the Pacific. He adds:

"Political influence has heretofore been able to withhold sufficient appropriations to give deserved importance to our navy-yard, and many ships were sent from here to Northern yards for docking and to complete their armament, but when it came to assembling in one body, no other waters were deemed equal to requirements. Of all the other Atlantic ports—combined the same facilities—Hampton Roads alone could properly accommodate America's proud fleet—the greatest that ever hoisted the nation's flag.

"Seven of those 16 battleships were built at Newport News; most of them coaled either there or at Lambert's Point; much of their repairs and fitting out were done at our local navy-yard—truly a remarkable record on Virginia's waters.

"What is true of Hampton Roads in a naval sense is far more true from a maritime point of view, because it is the focus of numerous railroad systems, radiating to every trade center of the continent.

"Home people are less impressed with these facts than are well-posted outsiders, but this modern naval rendezvous is likely to create universal interest in the waters of the lower Chesapeake.

"Within a few years this country has advanced from the seventh to the second place among the world's naval powers.

"Hampton Roads is now, as she has always been since John Smith entered the Capes, 'the King's chamber among the world's greatest harbors.' Such was the name and estimate given it by the 'pathfinder of the sea,' Mathew Fontaine Maury.

"Georgraphical position, depth of water, limitless anchorage, its relation to all the nations, aggregation of railroad trackage, climatic conditions, boundless coal supplies within easy reach, unrivaled distributing facilities by land and sea—all combine to ensure the upbuilding of its historic shores, on or near which so many great events are constantly being enacted."

"The development of the South means the enrichment of the nation," and as the leader in the development of the South the Manufacturers' Record is the most national of American papers.

THE LAND OF UNLIMITED POSSIBILITIES.

Ours is a land of unlimited possibilities. Broad as is this statement, sweeping out into the realms of the infinite as does the word unlimited, it is, nevertheless, true that we can say that our land is one whose possibilities are without limit. It offers for business and for wealth opportunities so far beyond what has been seen that the magnitude of our trade and of our fortunes, which now appear to frighten many, will in the years to come seem very small. Then we shall look back and wonder how it was that some were made to believe that our very prosperity was a curse.

Consider the whole earth, study the geographical location of all lands, weigh, if you can, their resources in climate, in soil, in minerals, in population and in the things which make for the highest development of mankind. The more you delve into these facts, the more you study the foundations of all human advancement, material and ethical, the more you will be amazed by the advantages given by Nature to this country, the more you will be appalled at our responsibilities by reason of our opportunities. Forget for a moment Alaska with its riches of gold and copper, its fisheries and its forests; forget our insular possessions, which may some day become strongholds in power and domination in the world's commerce. Fix your thoughts on the imperial region which stretches from Canada to the Gulf and to Mexico, and from the Atlantic to the Pacific. Here is Nature's storehouse of wealth; here is a region unmatched on earth; here is a country of 3,000,000 square miles, easily capable of supporting without crowding more than 500,000,000 people, a region so fertile of soil, so burdened with coal and iron and copper and other minerals that we do not have to concern ourselves for generations to come about their exhaustion.

All Europe has 42,800 square miles of coal area; the United States has 340,000. Even this difference of eight to one does not express the full advantage we possess. In actual quantity the margin in our favor is possibly twice as great as in area. Of Europe's 42,000 square miles, largely more than one-half is in Russia, which can hardly be counted as a trade competitor in world affairs. Great Britain, Germany and France, the centers of European activity, have only 14,400 square miles of coal. West Virginia has more than these three, and so has Kentucky. The South has more than four times as much, and the United States 25 times as much. The moving power back of all the mighty forces which have marvelously enriched the world since the steam engine inaugurated the doubling and quadrupling, and the redoubling and requadrupling of man's productive power, is coal. How strong, then, is our strategic position with this vast supply of the fuel which feeds the fires of human activities! In the world's dynamic power for material upbuilding, next to coal come oil and natural gas and water powers. To these nature seems to have set no limit. In our rivers we have available force, when fully developed, to duplicate the aggregate horse-power of all the manufacturing interests now operating in the whole country. The vastness of our resources for iron and steel-making immeasurably adds to the value of our coal. We already make about as much iron as Great Britain, Germany and France combined. In 1906 the production of these countries compared as follows:

	Tons.
Great Britain	10,149,000
Germany	12,422,000
France	3,319,000
Total	25,890,000
United States	25,307,000

A report made a few years ago to the Swedish Government estimated the total iron-ore supplies of all Europe at about 8,900,000,000 tons. Much of this is of very low-grade ores, running in some cases only 20 to 25 per cent. in metallic iron. The correctness of these figures has been accepted by the leading experts of Europe, and, therefore, we may take it that, as far as human knowledge now goes, all Europe has only 8,900,000,000 tons of ore. In this country we have, according to the reports of the United States Geological Survey, of known ores 12,000,000,000 tons, or largely more than all Europe. Granted that other sources of supply will be found in other lands, it is quite possible that such discoveries will be fully matched by discoveries yet to be made in this country. The United States Geological Survey credits the Lake Superior region with 1,500,000,000 to 2,000,000,000 tons, and the South with over 10,000,000,000 tons. At the increasing rate of consumption which has been in progress for some years the known Lake ore supplies would last only 30 or 40 years. The South, on the other hand, offers a supply equal to the needs of this country for generations to come. Even if no additional discoveries should be made in the Lake Superior district—and the MANUFACTURERS' RECORD believes that new discoveries will be made—the tremendous expansion of our iron and steel industry need not be halted, for with the known ores of the South we can continue an indefinite growth. When we have doubled, as we must inevitably do within the next 10 or 12 years, the 25,000,000 tons of today and are then producing 50,000,000 tons, we shall still find our resources in iron-ore equal to the demands of the times. Thus, in coal and iron, two essential factors in human advancement, the position of the United States in contrast with Europe stands out so pre-eminently strong as to guarantee to this country an overmastering domination in the metallurgical world.

Second only in the value of annual product is the cotton manufacturing of the world. No other industry except iron and steel exceeds the annual output of cotton goods. Though Europe has 86,000,000 of spindles, though its cotton mills and kindred interests represent an investment of $1,500,000,000 or more, its leading cotton-consuming countries do not raise a pound of cotton. For three-quarters of a century its governments have sought to develop cotton-growing in other lands to a sufficient extent to lessen their dependence upon the cotton plantations of the South. Their work has been in vain. Stronger today than ever before is the South's monopoly of the world's cotton trade. Every year adds to the influence and power of its position in the world's textile interests. We are raising an average of about 12,000,000 to 12,500,000 bales of cotton a year. We could double that by better cultivation and the better selection of seed without the necessity of adding a new acre to the land under cultivation. Whenever it may be needed we can, however, easily double the number of cultivated acres. If the world should eventually need, as in all probability it will, 40,000,000 or 50,000,000 bales from the South, this section will be able to supply it, providing the labor can be secured to produce it, and labor must be found to meet any pressing needs of the world. In summing up the assets of America of commanding influence in our national life and in the world's affairs, none counts for greater importance than cotton, illustrated in the fact that it annually brings from Europe $500,000,000 in payment for the average of 8,000,000 bales shipped abroad.

In any study of the resources of this country one naturally thinks of the things which have just been mentioned—the coal and iron and cotton and water powers. Their value is immeasurable. Their potentialities in the development of business and the creation of wealth cannot be stated in figures; nor would our minds be able to grasp the magnitude of the figures if it were possible to statistically tell the story. As illuminating the subject, take simply one fact. If the coal in the State of West Virginia could be capitalized at 10 cents a ton—a triflingly small figure to represent the value of a ton of coal—the total capitalized wealth of the coal of that one State would be $10,000,000,000. This would be about 12 times the combined capital of all the national banks in the United States. In fact, if West Virginia could capitalize its coal at 10 cents a ton and find a market for the securities it would be able to pay off the national debts of the United States, Great Britain and France; or, at present depressed prices, it could buy all the railroads in the United States, stocks and bonds included. West Virginia is marvelously rich in coal, but Kentucky is about equally as rich. The coal and iron of Alabama combined ought to be worth in the future as much as the coal of West Virginia. There are other States in the possession of mineral resources that very nearly match these richly-endowed commonwealths. With this simple illustration of what the capitalized wealth of coal alone in one State would be, we can get some conception of how impossible it is to state in figures that the human mind can comprehend the wealth potentialities of this country. While we naturally turn in such a summing up of America's resources to coal and iron and cotton and water powers, they only form a fraction of the sum total. We have oil enough to light the world; natural gas sufficient to run many thousands of prosperous factories and furnish heat to many millions of inhabitants; through Louisiana we dominate the sulphur trade of the world, and sulphur is one of the essential elements in many lines of industry, as well as in many things necessary to mankind. Tennessee and Florida have more phosphate rock as the basis of the manufacture of fertilizers than is known of elsewhere in all the world. Montana and other States produce a very large proportion of the world's copper, and without that the electrical industries of the earth would be halted.

As indicative of the phenomenal strength of our position, look for a moment at a few figures comparing our resources with those of all Europe:

	All Europe.	United States
Area, square miles	3,748,000	3,100,000
Population	400,000,000	85,000,000
Coal area, square miles	42,000	340,000
Coal mined 1906, short tons	654,358,000	414,157,000
Iron-ore resources, tons, as estimated by Government authorities	8,900,000,000	12,000,000,000
Pig-iron produced 1906, tons	26,700,000	25,300,000
Cotton produced, average number of bales	none	12,000,000
Cotton mills, running spindles	86,300,000	26,200,000
Wheat and corn, average number of bushels, about	2,200,000,000	3,400,000,000
Railroad mileage	195,000	225,000

Having an area 80 per cent. as large as that of all Europe, we have no such vast, almost uninhabitable, regions as are to be found in portions of Europe. Nowhere in all our land are the winters so rigorous as to make the development of the country impossible. While we have 85,000,000 population against Europe's 400,000,000, we have eight times as much coal area; we have far more iron ore; we have a cotton crop worth annually $800,000,000, while Europe has none; we have wheat and corn averaging annually about 3,400,000,000 bushels, against Europe's 2,200,000,000 bushels; we have 225,000 miles of railroad, against 195,000 miles for all of Europe; we are making almost as much pig iron as Europe, and mining over 60 per cent as much coal. What we are doing, however, is not so striking or remarkable as are the limitless potentialities which will enable us to do in the future far more—many times more—than all of Europe is doing.

A year ago, in an article entitled "America's Amazing Advance," the writer, discussing what had been accomplished and the prospects for the future, said:

Until we learn to think in billions we cannot measure the meaning of the material development of the United States during the last quarter of a century; much less can we mentally grasp the potentialities which the coming years have in store for us. Our progress, however, has only been the pioneering work of clearing the wilderness, of plowing and planting amid the stumps which mark the new land of the settler. Not yet have we had time to pull the stumps and drain the swamps. What we have been doing is like sowing by hand and gathering our harvest with the old sickle as compared with what we are now preparing to do. In our pioneering work we have had to disregard permanency to meet the immediate needs of the hour. We have had to make haste even though it meant some waste. However, like the pioneer who built his rude log hut and tilled the stump-ridden soil until increasing gains made possible the building of a better home and the clearing of his land in order to utilize labor-saving implements, we had to pursue similar methods in our national development until now, when we have entered upon a period where scientific farming will take the place of old soil-destroying farming and where scientific skill in manufacturing will mean changes as radical as those which mark the difference in farming methods. * * * All that we have done in this work of material upbuilding has been the perfectly logical working out of conditions which have surrounded us. * * * Now a point has been reached where it can be seen that all that has gone before is but the preparation for the real work of national growth—growth in agriculture, in manufacturing, in mining, and in all the varied interests of the country.

In studying the material advancement of the United States one is amazed at the marvelous progress of the last quarter of a century. Even 10 years ago the heart of man could never have conceived the magnitude of the development of today. But looking at this in the light of the world-wide revolution in business now in progress, considering our unique geographical position midway between Europe and Asia and the vastness of our resources beyond the power of man to describe, and bearing in mind the forces which today are making for the intensest human activities ever known, it will be realized that the achievements of the past, compared with what the future has in store for us, are but as the gentle shower of an April day in comparison with the mighty downpour of the summer rain.

The financial crisis, which has temporarily to some extent checked the easy flow of business, in no way changes the fundamental conditions on which the prosperity of the country is based. It does not lessen the increase of our population, which is now averaging about 2,000,000 a year. It does not lessen the fertility of our soil or the wealth of resources of coal and iron and other things. It only temporarily halts the consumptive requirements of the country; but this can be only temporary. With 85,000,000 of the most active people in the world, with a country nearly as large as all of Europe, infinitely better located geographically for the development of trade at home and commerce abroad than any other country on earth, we are but taking a breathing spell, resting by the wayside for a few days in order to begin a forward march, which in its accomplishments will as far exceed the progress of the last 10 years as that exceeded the progress of the preceding 10.

In all the development of our country there is nothing more remarkable than the advance in the prosperity of our farmers. Nothing more strikingly tells the story of national upbuilding than the statistics of what the farmers have wrought and of their progress in wealth. The value of all farm property in the United States, beginning in 1870, has been as follows:

Value of Farm Property.

1870	$8,900,000,000
1880	12,180,000,000
1890	16,082,000,000
1900	20,433,000,000
1906	28,000,000,000

This increase in the value of farm property, which between 1900 and 1906 amounted to nearly $8,000,000,000, or but little less than 10 times the aggregate capital of all the national banks in the United States, finds its explanation in the value of farm products. Beginning with the census year of 1870, we have the following:

Value of Farm Products.

1870	$1,958,000,000
1880	2,212,000,000
1890	2,466,000,000
1900	4,717,000,000
1905	6,415,000,000
1906	6,750,000,000
1907	7,400,000,000

Between 1870 and 1907 the value of farm products has risen from less than $2,000,000,000 to $7,400,000,000, the value in the latter year being three and a-half times as great as that in the former, although during the same time the number of people engaged in agriculture has not quite doubled. The total number engaged in agriculture in 1870 was 5,992,000, and the total number at present is 11,500,000. This remarkable change is shown in the fact that the value of agricultural products per capita for all engaged in agriculture, which was $286 in 1880, has been steadily rising until in 1907 it is over $600 per capita.

In the development of manufacturing we have seen an increase commensurate with the progress in agriculture. The value of all manufactured products, which in 1870 was $4,232,000,000, is now running at the rate of over $17,000,000,000 a year, the aggregate of manufacturing products and mineral output being nearly $19,000,000,000. Added to the $7,400,000,000 of agriculture, this gives us a total of agriculture minerals and manufactures of considerably over $26,000,000,000, against $15,000,000,000 in 1900 and $12,400,000,000 in 1890.

These facts and figures, which tell something of the foundation for future advancement in the way of natural resources and geographical location and something of the progress which has been made in agriculture and manufactures, should give us some conception of the marvelous position which this country is to hold in the world's trade and commerce. The progress of the last quarter of a century is merely the beginning of our real broad national advancement. What we have wrought in that period will be doubled, and in many things quadrupled, during the next 25 years. A realization of the possibilities which are ahead of us should quicken the life-blood and stir the pulse of every man whose horizon is broadened as he looks out upon the world's mighty activities. In the Orient we see all Asia awakening to new life. We see China, with its 400,000,000 people, or one-quarter of the world's population, in a stir and ferment, getting ready for a change which will doubtless be as marvelous as that which has suddenly placed Japan in the forefront among the great powers. The awakening of China will be an awakening into growing industrial activity, into the building of railroads and electric lines and all modern improvements. Imagine what must be the progress of a densely-populated country of 400,000,000 people long shut out from the activities of occidental industrial activities when once fairly started. There are some who seem concerned about the time when China may become our competitor in the world's trade, but for the next 25 years we need not disturb ourselves about that. For a quarter of a century China will be developing new industries, and in doing this will require of the rest of the world a vast amount of machinery of every kind. What it may do in half a century, when its industrial development has reached an advanced stage, remains to be seen, but for years to come China will be a buyer rather than a seller. We do not, however, need to look outside and depend upon the world's trade, although the United States is destined more and more to become a powerful factor in foreign commerce; we can look over the home field and see the limitless potentialities and the vastness of the work which is ahead of us. We are beginning the irrigation of a region long shut out from population, which when irrigated can support many millions of people. We are beginning the work of reclamation of the vast swamp areas, which cover millions of the most fertile areas in the world. It is estimated that 70,000,000 acres of swamp land can be reclaimed. This is almost as much as the aggregate acreage now given to wheat and cotton combined, and this land is infinitely richer than the best of the wheat lands of the country. Its fertility is without limit. The country is awakening to the necessity of a broad campaign of river and harbor improvements, which within the next 10 years will require the expenditure of at least $500,000,000 in making available for transportation purposes the highways which Nature has so abundantly given to our country, but of which we have been so negligent. In fact, we are rounding out a world of opportunities. All that we have done is but the pioneering work; now the scientific work of irrigation, of reclamation, of river improvement, of manufacturing, of vast railroad building and foreign commerce are all to be taken up and extended, and that, too, on a scale which will tax the constructive forces of America. The task is so great that the only question before us is whether our country has men brainy enough, and big enough, and broad enough to measure up to the responsibility. The rewards, if we can combine the needed brain power with these opportunities, will be greater than the mind of man has ever yet conceived of. What part in this mighty work are you going to take?

How can a country so blessed by nature, a country which has already wrought so marvelously, halt for more than a moment? With mountains bursting with mineral wealth, with a soil of every variety known capable of doubling its entire output without an increase of cultivated acreage merely by the improved methods now being adopted, with the Great Lakes on the north, the Atlantic and the Gulf on the east and south and the Pacific on the west, with the Mississippi and its tributaries splitting the very heart of the richest valley of earth, looking to Europe on the one side and to Asia on the other, our land has before it an advancement so stupendous as to dwarf into insignificance all that we have done. Broad indeed must be the vision of the men who, looking out from some mountain peak, are able to peer into the future, and, seeing what it has in store for us, plan things big enough to meet its requirements.

A COTTON SCHOOL.

A new departure will be made this month at the State College of Agriculture at Athens, Ga., in a cotton school to be conducted from January 6 to January 17, inclusive. The school is designed to help all farmers of the State to secure much useful information at a minimum cost, and to do something to solve immediately many of the problems which are most urgent by presenting to them concrete facts which can be applied successfully in every-day work on the farm. The schedule for the 10 days of the school allows for 50 hours of classroom instruction on the soil, fertilizers, cotton plant, seed selection, cotton diseases, cotton insects, feeding cotton by-products, cottonseed and cotton warehousing, 20 hours or more of practical work on grading cotton and 10 special lectures at night. The effort has been made to neglect no phase of the cotton industry, and the importance of the course, which is offered at nominal cost, is indicated by the fact that more than 4,000,000 acres of land on 225,000 farms of Georgia are producing about 2,000,000 bales of cotton a year, and it is believed that the cotton crop of the State can be doubled on the area cultivated at the present time, or that the acreage may be reduced by one-half and still produce an amount of cotton equal to that produced this year. To further such a desirable end is the object of the cotton school, and it is hoped that President Andrew M. Soule and the staff of the College of Agriculture may receive from the Georgia farmers the support for the undertaking that they deserve.

FOR IMMIGRATION.

In the January issue of the Southern Field, which Mr. M. V. Richards is using so effectively in promoting his work for immigration to the South, he has made a practical hit in securing from Messrs. G. W. Koiner of Virginia, S. L. Patterson of North Carolina, E. J. Watson of South Carolina, T. G. Hudson of Georgia, J. A. Wilkinson of Alabama, H. E. Blakeslee of Mississippi, John Thompson of Tennessee and Herbert Vreeland of Kentucky, commissioners of agriculture, immigration, etc., interesting articles dealing with the opportunity for settlers in their respective States.

HAS NEVER SOLD THE UNITED STATES SHORT.

By CHARLES A. MOORE,
President Manning, Maxwell & Moore, Inc., New York.

[Written for the Manufacturers' Record.]

We occupy what might be termed a dual position—that of a manufacturer, having six factories in several parts of the country, and being the principal and almost exclusive representative of some 40 other factories as merchants and jobbers, with a large corps of salesmen in the field, and with branch offices in Boston, Philadelphia, Pittsburg, Syracuse, Cleveland, Detroit, Chicago, Milwaukee, St. Louis, Birmingham, Ala.; Tokio, Japan, and in Europe. We naturally keep in pretty close touch with what is going on in the industrial interests.

This so-called "panic" or "depression" has been of an entirely different character from any I have ever experienced in my 35 years of active business connection. Business seemed, as it were, to drop right off abruptly, without any gradual incline downward, but with a sudden stopping in the receipt of orders and a gener. l halt, so that it may be more properly termed a financial depression than an industrial one. It is almost phenomenal to see the condition in which the entire industrial interests of the country were busy, with plenty of orders on their books and with no apparent diminution in trade, and with no large stocks of goods carried in any line in any part of the country, and then to see business brought to such a sudden stoppage. It naturally causes one to note the condition as peculiar and distinct from any previous business depression we have had in my active experience.

From my experience and observation, and from reports received from the managers of our branches and our salesmen, I am firmly impressed that the present depression is of only a temporary character. When one sees how comparatively few failures or business difficulties have developed in the industrial line with this sudden congestion of business it furnishes the most positive argument that we were not overdoing our business to such a degree as a great many at first thought. With the enormous resources of this country, its almost phenomenal growth and population, its great needs for everything required in the developing and building up of a comparatively new and growing country, with magnificent crops commanding good prices, and the people in a fine and healthy condition, it does not seem possible that we can remain at a standstill for any long period.

I believe that this temporary recession in business will have its good effect. The people who have been willing to buy anything they could get on 60 days' time, with a chance of selling it in 30 days at a profit, and could go to the banks and moneyed institutions and borrow freely to carry out their speculative ideas will have less opportunity in the future than they have had in the past, which will be to the benefit of the legitimate business of the country. The American people have an enormous nervous energy, and want to accomplish in six months what people in other countries in similar lines would be willing to take and would expect to take two, three and four years to bring about, and if they fail to meet their expectations as quickly as they desire they begin to look for someone to blame or some cause to attribute it to other than their own oversanguine and improvident way of doing.

I also believe that we must study greater economy in all walks of life. I think we are an extravagant people, and this is equally applicable to the wage-earner in his expenditures as to the capitalist. I was raised with the idea that it was respectable to be economical, and I feel that that feeling is growing less common among our people.

I also feel that we must give a greater attention to industrial education; in other words, that our people employed in the factories and actively in business are not carefully enough trained in their various duties.

I am in accord with the practice of Germany in the great attention she has given to industrial education, even to the extent of carrying it to compulsory education among the young men and women, who, after they leave the common school, are compelled to give certain hours each week to the learning of some practical occupation—for the boys, draughting, patternmaking or the operation of tools, and for the girls, household duties and needlework, weaving and the use of the hands intelligently guided by their minds. I find in our business, taking young men from school, that they come in without any training, either at school or at home, fitting them for the practical duties of their first work in an office or shop; and we are so exacting, and driving ahead at such high pressure, that the heads of departments, foremen and superintendents haven't the time or training to give young men suggestions that would develop them into being more useful to their employers and themselves. In other words, we are not thorough enough; we lack a continued development of what we term the "all-around mechanic" in our shops, who formerly was so well known and made New England the "beehive" of industry. In that section a few years ago a young man was proud of the fact that his father was a good mechanic. We now find that pride lessening and the development of good mechanics waning. We are trying to reach results too rapidly, without a proper fitting for it, and I think that today, without any invidious comparison between America and any other country, Germany is gaining its great prestige in commercial and industrial lines on account of the very thoroughness with which they educate their young people for the various callings that they enter.

I am an optimist. In other words, I have never yet sold the United States of America short, and I see no more reason for doing so now than at any time in my knowledge of the country. I remarked to our young men when I returned from Europe in July that if they would apply themselves diligently to their business—in other words, learn their job thoroughly, have faith in the country and just keep up with its natural growth—when they were my age they would have a business so stupendous that they would hardly realize its development. The great trouble is that many want to grow like the mushroom and destroy all of their competitors in business. In trying to accomplish this they very frequently overdo and go beyond what is a healthy and intelligent development of business. Too many of them have the idea that by creating a corporation or partnership, hanging out a sign and opening a store they should immediately commence doing a business equal to or in excess of that of some of their neighbors and competitors who have been years building up by steady growth a clientage that is only secured by long association and through the growth of that plant of slow growth—confidence—without which no business stands on a safe and sound foundation.

In evidence of our lack of thoroughness compared with some older countries, I called the attention of the machine-tool manufacturers of this country two years ago, upon my return from Europe, to a condition which made a great impression upon my mind—that while American machine-tool builders were the finest designers of labor-saving appliances and the best manufacturers of machine tools, and were so accepted by the people of the world, yet I saw all the American tools sold in France, Belgium, Italy, Germany and Austraia by German sales agents, who had equipped themselves for the commercial side of the question and taken our agencies, and were the men who marketed the product of the American tool designers and makers. The reason for that was that the Germans had equipped themselves, learning the language of the country in which they sold the goods, learning the wants of the people, settling down among them and becoming part and parcel of them, while the American representative wanted to skim over the country without knowing the language of the people or making a careful study of their wants, and expected to sell his tools as he would in his home market.

And while so much attention is given to the export field for our particular line of goods, it requires only a very little observation and careful analysis of the situation to know that the market of America is the greatest on the face of the globe; that we consume more; that we absolutely spend more for what we eat, drink, wear and use to the extent of three to five times per capita more than is spent by any other people. I would rather have the market of America than that of all Continental Europe. We know its advantages from observing enterprising Europeans, who are making every effort, through their diplomats and shrewd representatives, to make such trades in the way of reciprocity and reduction of tariff as will enable them to come into this field, which they all desire to occupy. While so much is said on the question of the tariff, and the question of political economy is such a deep one to study and comprehend, yet, in my judgment, it is all summed up in the question of wages. If our workmen are willing to live in the same quarters, with the same conditions for their families, wear the same clothing, eat the same kind of food and work for the same wages that their fellow-workmen in other countries do, there is no need of contending for the maintenance of a protective tariff.

The Necessity for Railway Expansion in the South.

By W. W. FINLEY,
President of the Southern Railway.

[Written for the Manufacturers' Record.]

The close of the year 1907 has witnessed a slackening of the rate of material progress in the United States. Various causes have contributed to produce a temporary business depression, which has been saved from being a disastrous collapse largely by the patriotic intervention of a group of courageous men under the leadership of that greatest of all constructing financiers, Mr. J. Pierpont Morgan.

When unreasoning panic had shaken the faith of less courageous souls in our entire business structure, just as on a previous occasion, when the credit of the nation itself had been shaken, Mr. Morgan did not hesitate. Rallying about him other men of financial strength who had implicit faith in his leadership, he and they risked their fortunes to stem the tide, and by their example inspired faith in others.

Recovery has already set in, but the time is opportune for a general taking of stock, and for such readjustments of governmental and business policies as will decrease the danger of a recurrence of such conditions as prevailed a few weeks ago.

Fundamentally, business conditions are sound. Our farmers have harvested abundant crops, for which there is demand in the markets of the world at remunerative prices. In few lines of industry has there been overproduction, resulting in the accumulation of large unmarketed stocks, and the financial institutions of the country have demonstrated their soundness by passing through the strain with few important failures.

The South has suffered with other sections, but fundamentally industrial and commercial conditions in that section are favorable to a speedy and healthy business revival. Great as has been the development of the South within the past quarter of a century, it has been along sound and conservative lines, and has been built up on the firm foundation of abundant and greatly diversified natural resources. Under these circumstances, all that is needed to bring about a resumption of progress and the attainment of a higher level of prosperity than has ever been reached before is the harmonious co-operation of all Southern people and all Southern interests with faith in each other, and the adoption by our Southern States of public policies which will assure the world of the safety of capital invested in Southern enterprises.

What may be termed the most potential economic tendency of the times is working constantly for the benefit of the Southern States. This is the tendency to eliminate waste, one of the effects of which is to bring about the concentration of industries in proximity to their resources of supply of raw materials. The effect of this is already seen in the development in the South of the cotton-mill industry, the cottonseed-oil industry, iron and steel manufacturing, woodworking establishments and industries of many other kinds. Its continued operation will result in the still greater development of all of these industries, and in attracting to the South a constantly-increasing proportion of those industries, the raw materials of which are Southern products advanced through their first stages of manufacture. The cotton-mill industry of the South, for instance, now consumes in the neighborhood of 18 per cent. of the cotton production of the United States. Not only will this consumption of raw cotton in the Southern mills continually increase, but there will grow up alongside of the cotton-mill industry establishments in which the materials turned out by the mills will be manufactured into garments and other articles ready to be placed in the hands of the final retail dealer. In the same way opportunities in the South are especially favorable for the expansion of all those lines of industry which use as their raw materials manufactured iron and steel. In addition to the industries already firmly established in the South, there are other lines of industrial development in which the progress up to this time has been comparatively slight, but which are destined, as a result of the economic tendency to which I have referred, to great future growth. Among these may be mentioned all those industries using clays of various kinds as their raw materials. Large quantities of Southern clays are now shipped to other sections, but there is no good reason why, in addition to the building brick and fire-brick industries, the South should not build up one of the greatest pottery industries of the world.

Side by side with the industrial development of the South, and largely as a result of it, there has grown up increased agricultural prosperity. It is often pointed out that all lines of business in the United States are profoundly affected by the conditions

of agriculture, and that bountiful crops and remunerative prices for farm products result in increased activity and greater prosperity in other lines of trade. The truth of this cannot be disputed, but it is equally true that the prosperity of the farmer depends upon prosperity in other lines of business. Bountiful crops cannot be of the greatest benefit to the farmer if business in other lines is so depressed that there is a falling off in the demand for farm products. It is true that the farmer of the United States has the markets of the world in which to sell, but if larger proportions of his crops must be sent abroad to market the effect is to depress both foreign and domestic prices. With the increase in population in the United States and the growth of industrial communities the home market is becoming each year more valuable to the American farmer, and anything that tends to depress that market, through the curtailment of business operations and the throwing of men out of employment, must work to his injury.

The American farmer is interested not only in the domestic market as a whole, but each farmer is interested in the development of local markets in his immediate locality, for such markets not only consume a part of his staple products, but afford him an opportunity for the more advantageous sale of perishable products, release him from dependence upon any single crop, and make diversified agriculture profitable.

It is for this reason that the Southern farmer is vitally interested in the industrial development of the South. The building of a cotton mill, for instance, in a Southern locality not only results in increased competition among buyers of cotton, thus tending to sustain the price to the farmer, but it brings to his doors a home market for a vast variety of farm products which he could not sell so advantageously in more distant markets.

Fundamentally, then, economic conditions in the South are favorable to its agricultural and commercial development, and to a constantly-increasing diversification of agricultural and industrial production.

This being true, the practical question which must confront every individual living in the Southern States, and everyone interested in Southern prosperity, is, how the South is to market its increased volume of products. If the products of Southern farms, forests, mines and factories are to be sold advantageously, they must be transported to those localities in our own and foreign lands where there exist effective demands for such products. The rate at which the South can develop is, therefore, limited by the capacity of the carriers on which it must depend for the transportation of its products to market, and I think that everyone who has made even a superficial study of Southern transportation facilities will agree with me in the opinion that transportation facilities in our section must be greatly increased and improved if they are to keep pace with the increasing demands that will be made upon them as a result of the agricultural and industrial development of Southern communities. My acquaintance with commercial and transportation conditions in our section convinces me that its most pressing economic need is a very large increase in transportation facilities, both by water and by rail, in the immediate future.

I am an earnest advocate of the development of every harbor on the South Atlantic and Gulf coasts, and of the improvement to the highest possible state of efficiency of every inland Southern waterway, and whatever influence I may have will always be exerted in favor of the adoption by the Federal Government of a comprehensive plan for the improvement of these waterways and the prosecution of the work as rapidly as it can be done efficiently. There are, however, many regions in our section which can never have efficient water transportation. They must always rely solely upon the railways, and in those regions where natural conditions are more favorable to the construction of waterways, water transportation must always be supplemented by railways. There will be plenty of work for the water carrier and the rail carrier, and each will benefit by the increased prosperity resulting from the operations of the other. I am convinced that the Southern people will advance their own interests by the advocacy of a broad and liberal Federal policy toward the improvement of the rivers and harbors of the South at the public cost, and of State and Federal policies favorable to the development of railways by private investors.

In the early days of railway development communities vied with each other in offering inducements for the construction of railways. The time for the necessity of public aid in railway enterprises has past, but, in the South at least, the railway system is far from complete, and far from being adequate for the transportation of the large volume of traffic that will be offered as Southern development progresses. It is to the interest of the Southern people, therefore, that the construction and improvement of railways in our section should be encouraged by public policies which will avoid the imposition upon railway enterprises of burdens of taxation proportionately heavier than those borne by property in other forms, and which shall permit to the railways the earning of a fair margin over and above the costs of operation. It is only by the adoption of such policies that investors can be encouraged to risk their money in railway enterprises in the Southern States.

The need of railway development in the South is the more pressing because our section is not nearly so well provided with rail facilities in proportion to its needs as are other sections of the country. The latest statistics of the Interstate Commerce Commission, those for the year ended June 30, 1905, show that in the Southern States south of the Ohio and Potomac and east of the Mississippi there were only 39,065 miles of railway lines, as compared with 55,193 miles in the smaller Northern area east of Illinois. Not only are there fewer miles of railway line in the Southern section, but the railways of that section, mile for mile, are on an average less efficient than are the lines in the Northern section. On June 30, 1905, there were but 957 miles of double-track railway in all the section south of the Ohio and Potomac and east of the Mississippi. On the same date there were in the Northern section east of Illinois 11,720 miles of double track. There was not in all the South a single mile of third or fourth track, while in the Northern section there were 1486 miles of third track and 1091 miles of fourth track. In the Southern section there were but 8797 miles of yard track and sidings, while in the Northern section there were 29,439 miles of such tracks. The total railway trackage of all kinds in the Southern section on June 30, 1905, was but 48,819 miles, against 98,929 miles in the Northern section.

The mere statement of these figures is sufficient to show that if the South is not to be seriously handicapped in the race for industrial supremacy, and is not to fall permanently behind other section of the country, it must have a very large increase in railway facilities. There are many localities in which new railway construction is urgently needed, and in those localities which are now adequately supplied with railway lines there is urgent need for more and better facilities. On many of the lines, in addition to a need for more double track, more side-tracks and increased terminal facilities, there is need for the improvement of the roadbed, the replacement of bridges with heavier structures, and the laying of heavier rails, so as to permit the use of larger engines, hauling heavier trains. In addition to the needed extension and improvement of the railway lines themselves, the Southern section will require large increases in railway equipment. On June 30, 1905, there were on the railways in the Southern section but 171 locomotives per 1000 miles of line, against 358 locomotives per 1000 miles in the Northern section. There were but 128 passenger cars and 5933 freight cars per 1000 miles of line in the Southern section, against 420 passenger cars and 13,019 freight cars per 1000 miles in the Northern section.

I express the opinion not only of myself, but of many of the most intelligent and thoughtful men of the South in all lines of business, when I declare that, under present conditions, it is much more important to the people of the Southern States as a whole to have increased and improved railway facilities than to have any possible reduction in either freight or passenger charges. I also express the views of many men in our section when I say that every increase or improvement in the transportation facilities of the railways of the South tends to increase the value of Southern farms and of every industrial enterprise in our section.

If this is true, every individual in our section is personally and vitally interested in the adoption by the Southern States of public policies that will facilitate railway development. The railways of the South ask no special favors. They recognize the propriety of such public regulation as is necessary for the prevention of wrong and for insuring to every individual equality of rights on the highways. All they ask is that they shall be permitted, under just laws, to earn such a reasonable margin over the costs of operation as will enable them to make a fair return on the capital already invested, thus strengthening their credit so as to enable them to secure the additional capital required to provide the increased and improved facilities so urgently needed. I have unbounded faith in the sense of justice and fairness of the Southern people. I have always believed that all that was necessary to insure to the railways of our section fair and just treatment was a fair understanding of the situation. I believe that such an understanding is being brought about and that we are on the eve of an era in which the Southern people and the railways of the South will co-operate harmoniously for Southern advancement, and in which such questions as may arise affecting the charges and service of common carriers will generally be adjusted by amicable conferences between those interested instead of being made subjects of political agitation.

As the Forty-Sixth State Enters a New Year.

[Special Correspondence Manufacturers' Record.]

Tulsa, Okla., December 25.

Conditions in the forty-sixth State are so exceptional that the effect of the quasi-panic from which the country is just now seemingly emerging cannot be considered in the same light with that which prevailed, or now prevails, in any other Commonwealth. The State as a whole was so prosperous when the trouble developed that possibly not even a single one of the leading bankers had the slightest suspicion of a local currency crisis, much less a decided flurry, extending throughout the length and breadth of the country. The banks were never in better condition—reserves fully up to the requirements, and in most instances materially beyond; deposits running above normal, while the reserve banks of St. Louis, Kansas City and New York held immense volumes of the money of the financial institutions of the new State. Not the least uneasiness existed as to the securing of money with which to move the crops; in fact, Oklahoma practically felt equal to the task of taking care of them herself.

Notice of the tying up of their money in the banks of the cities of other States came to the people of Oklahoma like a flash of lightning from out a clear sky. However young the State, the men who control her material interests can in no sense be classed as tenderfeet. Self-protection is the first law of nature, and these men did not stand on the order of instituting measures for the protection of the various interests of the State, but did what was necessary to be done quickly without hesitation and so effectually as to leave business of all classes moving on a solid basis, as freely as the floating of a summer's cloud.

To say there has been no slump in general business or in industrial enterprises would hardly be fair, but it may be truthfully said that in no instance anywhere in the State have industrial enterprises (save in oil output and development) or buildings under construction been perceptibly interfered with. Labor in all lines stood by contractors, as did the banks. Merchants and business men stood by the banks and the laborers, with the result that checks practically took the place of currency, and the lack of that commodity was scarcely felt. Could Oklahoma have controlled her own money, it is now evident that the banks of the State would not have been subjected to the disagreeable alternative of curtailing payments.

In Oklahoma proper, that is, the original Territory, especially in towns and cities, at present conditions can hardly be considered normal, from the very simple fact that with the signing of the Statehood proclamation by the President every saloon closed its doors, and consequently the circulation of currency naturally incident to the wide-open sale of liquor was shut off, and as another consequence in the several cities many handsome rooms were left untenanted. Until these quarters are reoccupied some of the business streets will present rather a lonesome appearance. Only a few people, however, entertain the opinion that prohibition will in any material degree check the progress of the State, either in the cities or the country. In what was Indian Territory prohibition already prevailed, and consequently the change to Statehood made no difference in the appearance of things. Whether State prohibition will result in the sale of less liquor than was sold under Uncle Sam's restrictions remains to be seen.

At present the effect of the slump in the oil industry is very materially felt throughout the oil section of the State, but whether this condition was brought about by the currency flurry is a mooted question. Those well posted have realized that there has been a tendency for several months past among heavy buyers to make lighter purchases. The pipe lines have never been adequate to handle the product, and as a consequence steel tanks galore have been erected. These tanks are at the present time generally well filled with oil, for which there is practically little or no sale, the heavy purchasers, notably the Standard Oil Co., confining themselves to the daily product, or so much thereof as can be handled by their own pipe lines. This suspension of tank buying will

naturally have the effect of curtailing production, to the end that storage supplies, of which the Standard alone has many millions of barrels, may be worked off. In this connection also the oil supply companies have withdrawn time credits, and this action will have the effect of seriously checking development operations. Some of the heaviest operators estimate that development will drop off fully 50 per cent. within the next six months.

Tanking oil is an expensive operation, and it is the desire of the purchasing companies to eliminate that burden. To this end they are not only using every effort to increase the capacity of their own pipe lines, but are encouraging the building of independent lines. The great stumbling-block in the way of building new lines and fully utilizing old lines appears to be the rules of the governmental department under which lines are built and operated. The several pipe lines are now joined in an effort to have these rules modified, and it seems to be the opinion of the best-posted oil men that the quicker they are modified the better it will be for the country in general.

With Statehood also came the two-cent railway fares, and to the credit of all the railways (save the Fort Smith & Western, which road protested because of its inability to carry passengers at the two-cent rate) operated in the new State, they have acquiesced in the provisions of the constitution without resorting to legal formalities. It is too soon yet to form an estimate as to the effect upon passenger revenues. One favorable symptom, however, is that while the currency scare would naturally have the effect of reducing revenues, there seems to have been no decrease in the number of travelers. Oklahomans generally are of the opinion that the two-cent fare will not only result in bringing thousands of homeseekers into the State who would not otherwise come, but that increased local travel will at an early day enlarge the passenger revenues much beyond what they were in the past or could be made in the future under the three-cent-per-mile rate. However this may be, should experience demonstrate that railways cannot, with a living profit, carry passengers at two cents a mile, under the constitution they can be relieved of this burden and go back to the three-cent rate.

In the matter of freights, the incoming tonnage reported at the heavy stations along the several railways permeating the State does not seem to have been materially decreased because of the currency scare. Not so much complaint, however, is heard of the shortage of cars, and this is possibly an indication that the money cramp has and is now somewhat interfering with the moving of cotton and live-stock. Corn in the new State does not cut much figure this year, though there is enough and to spare of all cereals, alfalfa, hay, vegetables, etc. The people of Oklahoma are a long, long way from anything smacking of want, much less of famine. They could endure a very short crop in 1908 and still have enough to carry them over a season or two more.

In the matter of money, the moment the reserve banks that now hold the surplus funds of Oklahoma's financial institutions release these funds currency will be more than plentiful; in fact, quoting the language of one of the solid, conservative men of the State, "It will be a drug on the market—go begging for lack of borrowers." Unfortunately for the possible outlook, the opinion of this gentleman is that: "There will be few takers for the money, not that it could not be profitably used, but from the fact that confidence has been so fearfully shaken that even the most optimistic individuals will hesitate, at least for awhile, to take up any new lines of business." The writer, however, from what he knows of conditions in the new State, does not coincide with the conclusions of this gentleman. While naturally a Presidential year is likely to be a slow one, the opportunities in Oklahoma are so numerous and so promising that they will simply force themselves upon investors in spite of weak nerves.

The new State comes into the Union with a constitution to a greater or less extent experimental. A very large majority of the people here believe that it is the "very best ever," and are sure that it will prove the sina quo non that will open wide all doors of progress and lead up to universal prosperity within the Commonwealth. Naturally, however, there will be a desire upon the part of many, and especially with the residents of other States who contemplate coming here, "to be shown." While the constitution, to the mind of the writer, contains much surplus matter, possibly verbiage, it is, on the whole, a sound document under which every interest of the State will be fully protected. If it has faults, gradually they will uncover themselves, and under the initiative and referendum the document will eventually resolve itself into a model by which the charters of the older Commonwealths may be remodeled and brought more nearly to conform to the will of the people. The writer is truly of the opinion that no individual need be deterred from coming to Oklahoma because of any fear of the constitution.

The resources of Oklahoma have been so thoroughly discussed, not only by the writer in the columns of the MANUFACTURERS' RECORD, but by correspondents of the great metropolitan dailies, that anything that might be said in this article would be superfluous. Suffice to say that the State has a greater variety of resources, and possibly a heavier volume of each, than any other State in the Union. She has coal, oil, gas, gypsum, asphalt, stone of all varieties, granite, shale, clay, glass sand, salt, iron, lead, zinc, mineral waters, and, in fact, every possible mineral, including gold and silver. Only development will demonstrate the more than wonderful resources of the new State. The whole State is plentifully watered, and she has within her borders an ample supply of merchantable timber—hard and soft; the timber culture is one of the growing industries.

In agriculture she is par excellence the Commonwealth of the Union, for absolutely there is nothing that can be produced in any other State that cannot be grown here. Lands can be had at moderate prices in comparison to what the same class can be had in any of the other States, and for a certainty the investor can always be assured of steady values and generally a sure increase.

Railway promotion is active, and even now the State is better equipped with trunk and lateral lines than the generality of other Commonwealths. Several interurban lines are in contemplation, with one, extending from McAlester to Hartshorne, in operation, and at least two others under construction.

Adding the $5,000,000 fund provided by Congress for the Indian Territory to that already held by Oklahoma Territory, the new State enters the Union with an assured school fund of possibly $35,000,000—a sum that really dwarfs the fund of many of the older States.

In cotton, Oklahoma has already demonstrated her possibilities. If the past is any criterion for the future, she will within the next few years, if her people so decree, become possibly the greatest white staple State of the Union.

With reference to manufactures, while there are many minor industries in the State, the field is practically virgin, and it only remains for capital to touch the springs to set in motion the wheels that will grind out unlimited wealth and at a very early day place the youngest State of the Union in the very forefront of all the industrial Commonwealths. Where there are so many eligible locations it would be invidious to particularize. The natural resources are widely scattered, and their diversity great to an extent almost incomprehensible. Whatever line a manufacturer may desire to take up, he can find the raw material in superabundance in some part of the State, and generally convenient to railway or water transportation. The individual seeking a location cannot well go astray. Without exception, all of the important cities are offering special inducements to manufacturers, and it only remains for the individual who desires a location to investigate and make a selection.

Judging from conditions down here, in comparison with those reported from other Commonwealths, the State has suffered less from the financial jolt than any other section of the Union.

Finally, it occurs to the writer that no one can long remain a pessimist and live in Oklahoma.

F. M. P.

CHARLES CATLETT ON ALABAMA IRON.

By THOMAS P. GRASTY.

[Written for the Manufacturers' Record.]

A singularly striking exemplification of the old saying, "it's an ill wind that blows nobody good," was presented when at the most critical moment of the recent monetary collapse the South got what all painstaking students of Southern industrial needs at once recognized as a boon of inestimable value. This compensating good, blown southward by that frightfully destructive "ill wind," was (as goes without saying) the taking in hand of the Tennessee Coal, Iron & Railroad and the resultant assurances (implied if not expressed) by the United States Steel Corporation. This one occurrence may, and I believe will, ultimately compensate the South many times over for all the damage done by the recent panic—and I was about to say may even up the damage done to Alabama's industrial agencies by the destructive forces led by agitators.

Every thoughtful business man in Alabama welcomed the advent of the world's most powerful and best equipped organization for the broadest and most thorough development of Alabama's resources. They knew that the Steel Corporation alone could do justice to the situation, and felt that at last the future of that enormously rich region commonly called the Birmingham iron district was in safe, strong hands. They realized how the general prosperity of the whole State—yes, of all the Gulf States—would be promoted by the introduction of those admirable methods which the highest skill and ample money had made possible elsewhere.

And while this was the prevailing way of thinking and feeling in the most intelligent business circles—among men who know the value of money and method—it was realized by those who had made a special study of things metallurgical and of Alabama's ore resources, and who were familiar with all the handicaps and drawbacks and setbacks that have been due to lack of capital and to the consequent inability to inaugurate and maintain a scientifically economical and broadly progressive policy in keeping with the possibilities of the district—this expert class realized still more vividly what an unmixed blessing this change of ownership of the Tennessee Coal, Iron & Railroad had brought to Alabama and the South. Some of the most noted of the iron-ore experts have already given publicity to opinions in keeping with my own interpretation of the true significance of this transaction. A leading banker here at Birmingham takes the ground that it at once lifts all good mineral properties in Alabama from a merely speculative level to the high plane of permanent investments.

Another result of this transfer has been greatly to increase and intensify public interest in what is to be found around this center. Men who a year ago could hardly be persuaded to give a moment's attentive consideration to the resources here grouped so wondrously are now eager to hear or read anything from a reliable source likely to throw light on this situation. As one of these expressed it: "There must be something pretty big down there, or else the Steel Corporation wouldn't have bothered with it."

But in spite of all this favorable public sentiment, the obscure politician is busy trying to upset the whole transaction. For has not a Tennessee Congressman already introduced a resolution—which let us hope was merely "for buncombe"—to set in motion machinery to prove it to have been an illegal transaction? The views of such a man as Colonel Shook or Charles Catlett are worth more than those of all the politicians in the country put together as to what is best for Southern industrial development under the conditions that exist today.

For more than a month Mr. Charles Catlett, the well-known geologist of Staunton, Va., in company with Mr. W. N. Merriam, a distinguished geologist of Duluth, have been hard at work (and are still so) making an examination of the raw-material resources owned by the Tennessee Coal & Iron Co., which everybody calls "the T. C. I." It happened that I know Mr. Catlett very well, and it was natural that I should have had a number of talks with him during his stay in and around Birmingham. I was very anxious for him to tell me, for the MANUFACTURERS' RECORD, just what he thought of the purchase of the T. C. I. by the Steel Corporation. But it is a rule of etiquette observed by geological experts not to talk for publication about the matters they are at work upon—at least until after they have turned in their reports. And therefore at present Mr. Catlett does not feel himself at liberty to discuss the value of that purchase nor the relations of the Steel Corporation to it. But he did talk—and with an enthusiasm I have never before known him to manifest—about the resources and advantages of Alabama and the future of the Southern iron and steel industry, with particular reference to the Birmingham district and the iron-ore resources directly and indirectly tributary to that center. And I am permitted to quote verbatim a few of the things he has said to me since he came to Birmingham on this occasion.

He admitted that he never came into this section, with which previous work had made him very familiar, without being impressed anew with the wonderful advantage which it possesses in the juxtaposition of the raw material used in the manufacture of pig-iron. He added that too much stress could hardly be laid upon this important fact. "While it is the boast of modern civilization," he continued, "that it has annihilated time and space, which may be almost true where ideas alone are concerned, yet in the large industries, in which the mass of the material used amounts to many million tons a year, the fundamental and, I might say, overwhelming, consideration is one of transportation—the transportation of raw material and the transportation of the finished product—one which can never be eliminated.

"It is not a figure of speech, but an actual fact," Mr. Catlett declared, "that one can stand in the mouth of a coal mine in the Birmingham district and shoot a pistol ball in the stack of a furnace, and with a rifled cannon could land a projectile in the ore mine, while the path of this cannon ball would cross the magnesian limestone rocks which furnish the necessary flux. A total cost of less than a dollar for collecting the raw material which goes to make up a ton of pig-iron would seem to leave little to be desired in this respect."

I here asked Mr. Catlett if this extraordinary assembling of raw material on the part of nature occurred anywhere else within the regions where, as a geological expert, he had made investigations.

"Theoretically, yes—practically, no. There is usually some defect in quality or development which lessens the value of the combination. The conditions referred to are the result of what the geologists call a 'fault,' which in this particular case might be called a beneficent gift from nature. A 'fault,' as the name implies, means a displacement or break in the strata and is usually to be dreaded in mining. In this case a great fault has served to bring close together beds which normally are far apart, and this occurs most fortunately at a point where both the coal beds and the iron-ore beds are in an excellent state of development.

"It is worthy of remark," he continued, "that the Clinton ores, which form the basis of the Birmingham iron industry, and which can be traced all the way from Northern New York, reach their most perfect development in Alabama, and that the 'brown' ores and the 'gray' ores, valuable each for some special quality, are also peculiarly well developed in that State and in the region closely adjacent thereto, and all within a reasonable distance of the coking-coal field. It looks as if nature had made a special effort to assemble the raw material in the very section which promises to need it most.

"The problem of transportation must be relatively greater in importance as time goes on, and it is evident that the period of forced development along unnatural lines is passing away. The line of the least resistance between the producer and the consumer promises to be the line of the least distance, and products will ultimately cease to be carried for thousands of miles only to be hauled back again. It is natural and inevitable that the Southern iron industry will supply the South and all that great section grouped around the Gulf of Mexico, which Commodore Maury predicted was destined to be the industrial center of the world.

"The bulk of the pig-iron of the South still goes hundreds of miles to find its market, whence, after the crudest manipulation, it is often sent back to the very furnace from which it came. It is certain that this will not continue, but it should not be forgotten that the ability of the industry to stand this great railroad haul and still live is the surest warrant of its wonderful vitality and a promise for its future expansion.

"The Southern iron industry has a market of enormous potentiality which is peculiarly its own, and yet has contented itself with the relative meager returns which have come from the crudest products, and has subjected even these to an enormous tax in the way of a railroad haul to market, and has withal been singularly wasteful of its own resources, and in spite of all this it still lives, so great is its virility."

Mr. Catlett said that it was an old story that America had been wasteful in everything. "The warning has already gone forth in regard to the timber supply," he continued, "and yet the timber supply can be made perpetual by properly assisting nature. This is not true in regard to mineral deposits. Nowhere, so far as we know, is nature replacing our mineral deposits to any material extent as they are exhausted. The amounts of iron ore in this country are too vast to permit of any present anxiety in this particular, and we need not fear that our grandchildren will lack. What is of far more importance to this generation is the price we will have to pay for it. The inevitable tendency in any industry based upon natural resources is toward increased cost. It is natural that the most easily won deposits will be attacked first and afterwards the inferior and more costly. Two or three times within the last 25 years this country has been protected from a permanently increased cost of iron and the development of the entire country given a wonderful impetus by the discovery of new deposits of large extent which could be easily won. One has but to imagine what the iron industry would be today if the Mesaba deposits had not been discovered.

"Another factor making for higher costs is the tendency of our civilization to increase the compensation received by labor. The effect of these forces will be that the price of iron must necessarily advance unless this existing tendency is more than counterbalanced by increased technical skill and improved appliances."

With special (and for him unusual) emphasis Mr. Catlett then said: "*It is in these particulars that the great aggregations of capital can be made the source of such enormous benefit to the country at large.* They can command the best technical skill available, and can conduct experiments and inaugurate methods involving great cost which would not be possible to small concerns. Only the skill of the chemist and engineer, combined with the accumulated wealth of the capitalist, can protect the car of progress from the brake of high prices."

Mr. Catlett cited in this connection the Gayley dry-air blast, which has been developed by Mr. Gayley, the first vice-president of the United States Steel Corporation, and which promises to so greatly affect the iron industry. The inauguration of this was not possible without large expenditure and great risk, and in this case the actual results far exceeded what was predicted from a theoretical consideration of the improvement. Mr. Catlett also spoke of the gas engine and the retort coke oven as among the great economizers in the future development of the iron industry, while their influence has as yet hardly been felt in this country. He feels satisfied that the improvements which high technical skill and large expenditure make possible will largely, if not quite, offset the natural tendency to increased iron prices, and that the South may be assured not only that it has within its borders sufficient material for all its needs, whatever they may be, but that this iron will be supplied on terms that will help rather than hinder the rapidity of development.

In conclusion I asked what would be the probable policy of the Steel Corporation in Alabama. He replied:

"It is inconceivable that those who have shown themselves capable of doing great things well will fail to utilize to the fullest every opportunity presented to them. The whole South is teeming with newly awakening life and wealth, and each forward movement gives an added demand and an added value to the iron resources of all that section. These forces act and react on each other."

As a matter of fact, Mr. Catlett, who is among the most discreet and conservative men I have ever known, might have premitted me to quote a number of other extremely interesting and just now significant tributes to the value and importance of Alabama's iron resources but for the circumstance stated at the outset, that he is now employed and at work as one of two experts—one from the North and one from the South—whom the United States Steel Corporation has sent to make an examination and a report upon the recently purchased "raw-material resources" of the Tennessee Coal, Iron & Railway Co. This purchase is, in my own opinion, the largest bargain ever got by any buyer of iron ore and coal of which the public has had knowledge, and while I am giving this as merely my private opinion, I am nevertheless morally certain that all true experts who may have the opportunity to examine these properties will back it up.

Enough, however, was said by this extraordinarily able iron-ore expert to justify my own conclusions, and in connection with this I may be also justified in saying that in quoting Mr. Catlett I have used his exact words. Ordinarily this latter statement would be supererogatory, but I am sure it will not be so considered by any of the buyers of iron-ore properties who have acted on Mr. Catlett's advice and therefore know how penurious of praise he is by nature and by practice. For Charles Catlett to say that the South "has within its borders sufficient iron ore for all its needs and that Southern iron will be supplied on terms that will help rather than hinder the rapidity of development"—when he said this he said what in certain high metallurgical circles will mean more than the most elaborate magazine article by some experts would mean though punctuated by strings of figures in which anything under billions of tons would seem small and inconsequential. And when at the close of our talk he said "it is inconceivable that those who have shown themselves capable of doing great things well will fail to utilize to the fullest every opportunity," he, in effect, said all that the most ardent desirers of Southern development and prosperity need care to hear. For it would be worse than superfluous to indulge in wordy prognostications and predictions where common sense points so clearly to the course which the Steel Corporation will inevitably pursue.

What more could be said by a man who weighs his words than that the ability of the Southern iron industry to live at all under existing handicaps and wasteful methods "is the surest warrant of its wonderful vitality and a promise for its future expansion?" And, by the same token, it was the acme of enthusiasm (in a man of the Catlett type) which prompted such words as these: "It is natural and inevitable that the Southern iron industry will supply the South and all those great areas grouped around the Gulf of Mexico which Commodore Maury predicted would in time become the industrial center of the earth." Nor did Mr. Catlett, while commenting on the immensity of nature's beneficent gift in bringing together by means of a great "fault" the coals and flux and red fossil ore, lose sight of the significance and value of the brown ores, nor of that vast, though comparatively recently exploited, addition to Alabama's iron resources, the stratified gray ores of Talladega county. And, by the way, the new Atlanta, Birmingham & Atlantic Railroad will soon bring the gray ores, so high in metallic iron, within still easier reach of furnaces at Birmingham, although already (to quote Mr. Catlett) "within a reasonable distance of the coking-coal field." And so there is much food—yes, meat—for thought in what this famous expert has to say to the MANUFACTURERS' RECORD of the Birmingham iron district and of the new promise that has been vouchsafed for the profitable expansion of its productivity.

Birmingham, Ala.

Coal and Timber Activities in West Virginia.

[Special Correspondence Manufacturers' Record.]

Charleston, W. Va., December 28.

While this section of the upper South has not escaped the effects of the general stoppage of work on uncompleted enterprises, yet West Virginia's position has rendered her immune from much of the business disturbance which has occurred throughout the country. The money stringency, of instant and unprecedented severity throughout the entire nation, had an exaggerated effect on business, because it came at the time when the periodical big draft is made on the money centers for the moving of the crops of the South and West. The resultant era of suspended currency payments, of clearing-house certificates and bank script is of current knowledge and almost universal experience. West Virginia feels, therefore, that she has an entire right to point with pride to the fact that throughout this period of currency famine her banks have not only remained solvent, but have never stopped currency payments. While there has been a prudent curtailment of loans, and money for speculative purposes has been as unavailable as in New York or San Francisco, yet no payments on checks or drafts have been refused, money for legitimate business purposes has not been denied and never a payroll has been turned down.

The apparent reason for this gratifying condition is the fact that the money "crops" of West Virginia are coal, oil, gas and timber, and for these there is practically a market all the year. The cost of "getting in" one of these "crops" does not pile up at a certain season, nor is the harvesting confined to a few brief, hurried and expensive weeks. It is here practically a "continuous performance," and wealth production goes on all the time. Moreover, the coals of West Virginia are coming into greater use all the time, as their values are becoming better known, and the past year has been the best ever known in the history of the State. There have been mined over 43,000,000 tons, and the prices obtained have been the best for many years. On the Chesapeake & Ohio Railroad alone there were 1,000,000 more tons shipped during the four months ending October 31 than for the same period last year, and on this road is one of few developments of new coal territory now being carried forward in the State. While construction work on the double track of the Chesapeake & Ohio between Charleston and Huntington was suspended several months ago, the Coal River branch of the road is partially completed, and when done it will open up one of the greatest coal territories in the United States, and a fine timber section as well.

The completion of the Kanawha & West Virginia Railroad from Charleston to Blakely, a distance of 35 miles, opens another new and important coal territory which is already being extensively developed.

Another of the important enterprises in which Charleston is vitally interested, and which has not been halted by the stringency, is the big new bridge across the Great

Kanawha to the west of the city's center. This will be one of the largest and finest pieces of bridge construction in this section of the country, and it is scheduled to be finished by the first of June. It will be a combination steam railway, electric street railway, wagon and passenger bridge, and will be used by every railway entering the city—the Chesapeake & Ohio, the Kanawha & Michigan, the Coal & Coke and the Kanawha & West Virginia. By it the Chesapeake & Ohio will obtain access to the great Kelly Axe Factory, and will be enabled to bring its freight cars direct into Charleston, instead of transferring them by barge line as at present. The importance of this bridge will be understood when it is known that last year the Chesapeake & Ohio ferried on its transfer 27,000 freight cars for the city of Charleston. This tonnage will necessarily be largely increased when the more adequate means of access to the city which the bridge will give have been provided. It will materially cheapen freight rates to Charleston, and will do away with the $5 transfer and switching charge that is now imposed on every car crossing the transfer.

The Coal River Railroad will use the bridge, bringing all of its trains, freight and passenger, into the city of Charleston. As this road will, when completed, tap a rich country now without railroads, it will prove a very important feeder and business developer for this city.

Over this bridge the cars of the Kanawha Street Railway will be run, providing service for the entire Southside, with its large residence and factory population. It will serve not only the nearby industries, the Southside foundry, boiler works, tanners' extract plant and Baldwin Steel Works, but will be extended at once to the new industrial suburb of South Charleston, and on to St. Albans, 12 miles away, where the Big Coal river empties into the Great Kanawha. With the announcement of this extension it is also stated that the street-car line will be constructed in the other direction, to the east, as far as Mt. Carbon and Montgomery. The immediate extension of the line to South Charleston and St. Albans will be undertaken as soon as the cars can get across the bridge.

Developments at South Charleston, which is about five miles from the center of the city, have gone ahead with apparently as much vigor and rapidity as if there had been no disturbance of confidence and tightness of money anywhere, and one important glass factory has begun operations; another is almost ready to fire up; a new iron-works plant is under construction, and still other factories are in a more or less forward condition. Where only a year ago there were merely fields of grain and meadows, there are now nearly 100 substantial houses, and on a visit to this busy section it would be hard to imagine that the grip of the money stringency had reached this valley. Nevertheless, it is stated that a number of new enterprises have been held up on account of financial conditions, so that a still more remarkable degree of activity will be experienced when normal conditions have returned.

The construction of the Coal River Railroad has had a marked effect on the entire country it reaches, and it has even transformed the little village of St. Albans into a busy, progressive city. New houses are being built; land values are increasing, despite the panic; new factories established and a development inaugurated which bids fair to result in a continuous city all the way between St. Albans and Charleston.

The construction of the Coal River Railroad is a development the importance of which can hardly be overestimated, and its acquisition by the Chesapeake & Ohio Company was a master stroke, strategically and industrially. Until this road was undertaken the great coal fields of the Coal river, the richest in the State and the earliest discovered, were without railroad transportation, and consequently without development. By the purchase of the Coal River road the Chesapeake & Ohio took from the Deepwater road an opportunity to secure an easy outlet for its line to the West, and it also splits up what would have been control of this large and valuable territory. Now the Deepwater is surveying a line generally along the opposite bank of the river from that on which the Coal River road is located, down Big Coal river to St. Albans; but while a good line has been secured, a vigorous and earnest competitor is now in the field. The Coal River road has been completed, and passenger and freight trains are running from the main line of the Chesapeake & Ohio road at St. Albans, 25 miles up the river to Peytona. Twelve miles above the mouth of Coal river the Brier Creek branch leaves the main line. On this branch are located the Knickerbocker and Reynolds mines, belonging to the Paint Creek operation, and the Olcott mines, belonging to C. Morgan Olcott of New York city. A fine business is being done on this branch line in the way of coal production.

At Peytona the purchasers of the old Peytona Coal Co. are arranging to put in large operations. Here the road taps the extensive lumber mills of the Burns Bros. of Mansfield, Ohio. These people, who came into the locality 18 months ago and made large investments, are cutting 100,000 to 150,000 feet a day and are shipping out an enormous quantity of lumber which they cut and stacked before the road was completed. The Coal River road has already justified its construction by reason of the large tonnage it is taking out, although it is no more than a third completed, and the larger territory to be developed has not been reached. It is proposed to extend the road up Coal river to a connection with the Cabin Creek branch of the Chesapeake & Ohio at or near the Raleigh county line. This will enable great areas of coal on the upper Coal river to be developed by a continuous down grade. By this connection of the Cabin Creek and of the Coal River Railway up Big Coal there will be developed all of the great debatable coal territory on the Marsh fork of Big Coal river and in the area between Marsh fork and the upper Pond fork of Little Coal river, which land is within reaching distance of the Deepwater road. The Chesapeake & Ohio, in order to forestall the easy access to the Marsh fork of Coal river by any other road, surveyed and purchased the right of way down the Marsh fork and put an emergency force on this river and built part of their line, possessing themselves of easy grades and the strategical portions of this very valuable territory. The Deepwater still possesses the line of survey across from the main Deepwater line into the Marsh fork of Big Coal, and their survey of a main grade down Coal river has been completed, it is stated, within the last six months.

A branch of the Coal River road leaves Big Coal at the junction of Little Coal river and proceeds up Little Coal river to Madison, which is the county-seat of Boone county. At Danville and Madison, on opposite sides of the river, there has been built within a year more than 125 houses. Arrangements are being made to develop the enormous areas of coal in this section. A 17-mile line up the Spruce river and Laurel fork from Boone Courthouse has been practically completed, opening up one of the largest and most important areas of coal and timber in this country. The road also is to be constructed up Pond fork, which will develop the eastern portion of the enormously rich Little Coal river territory.

It is said to be the ultimate object of the Chesapeake & Ohio management to connect the Coal River road with the Guyandotte branch of the Chesapeake & Ohio road. This can be done by a short tunnel through the mountains on the Buffalo or down Dingess run. The area of development here will be about 35 miles one way and 35 miles the other. Mr. Neil Robinson, the coal expert, has declared this to be the greatest territory of bituminous block coal in this country. In the Bald Knob mountains he developed for some owners 57 feet of workable coal in one mountain. This did not include two valuable seams which are under ground, and which will add 10 feet more to this enormous total. In this development one vein of coal occurs above the other from the foot of the mountain to the top, and all seven of the veins can be worked at the same time by one organization and one central power plant.

Another authority pronounces this the greatest development of coal, both of the No. 2 and of the No. 1, which are the gas, steam and smithing coals, and also of the splint coals, that he has ever seen in this country.

While the Coal River Railroad will thus develop an enormous coal-carrying capacity, at the same time it will penetrate a great body of splendid timber.

In this age of steel, when shipping material is so generally of iron, a visit to Upper Coal river will show that the days of wooden shipbuilding are not over. A large Canadian concern has for the last three years been engaged in getting out squared stuff. Over 200 French-Canadian choppers are in this field. The effort appears to be to obtain oak 60 feet in length and from 18 inches to three feet square. These timbers are splashed down the river at an enormous expense, are floated down to Ironton and Portsmouth, where they are put on the cars for Detroit, where they are transshipped to vessels and thence taken to Canada for use in shipbuilding. Within a short time they will use the railroad for the haul to Portsmouth.

This territory bids fair in another respect to become amazingly rich. It is developing into a fine gas field, and on the divide between Mud river and Coal river some splendid oil wells are being developed, and at the rate it is now going it seems that the oil field will extend entirely to the banks of the Coal river. This is entirely a recent development, the oil wells having been discovered only within the past six months.

While the high tide of development of the past five years cannot be said to have continued unabated in this section, it is evident from this presentation of the activities which are seen in and around Charleston, and with which Charleston men and interests are very largely identified, that there is very far from a condition of stagnation here. As a matter of fact, there has been an almost phenomenal stability of land values all the while the shrinkage in stock values has been going on. At no time since the money stringency began has there been a bargain sale of lands in this section. Prices are standing up precisely as before the panic. In eight leases of coal lands which have been made within the past three months, landowners actually obtained better royalty prices and better terms for leases running over 30 years' time than had ever been given before.

With the enormous quantities of coal, oil, gas and timber which this section contains, there is certain to be a revival of tremendously active development as soon as money for operations becomes again normally abundant. With only a temporary—and even then but partial—slackening of the pace, there is certain to be a development for the next quarter of a century that will make this one of the busiest sections of the world. And as the development goes on it will march in almost processional form across the borders of West Virginia and all through Eastern and Southeastern Kentucky, where natural resources are so nearly akin, where so much of development yet remains to be done, and where conditions are ripening for the army of developers that is to come.

ALBERT PHENIS.

MINERAL RESOURCES OF OKLAHOMA—II.

By DR. CHAS. N. GOULD,
Professor of Geology, Oklahoma State University.

[Written for the Manufacturers' Record.]

The Oklahoma oil field has been developed gradually southward from Kansas. As early as 1882 drillers had discovered small quantities of gas in that State, but it was not until 1893 and 1894 that anything like extensive operations began. Oil having been found in the southern counties of Kansas, the drillers began to venture across the line into the Cherokee and Osage nations. For the past 10 years the drillers have been slowly and cautiously working south, until at the present time they have reached several points 75 to 100 miles south of the Kansas line.

The greater part of the development in Oklahoma has been in three general regions. Probably more than two-thirds of all the oil produced in this State has been found along the line of the ninety-sixth meridian, which is the dividing line between the Cherokee and the Osage nations. Wells drilled within a few miles east or west of this meridian line have almost invariably found large quantities of oil or gas. In Kansas the wells at Caney and Peru are located near this line. The most prominent fields along the ninety-sixth meridian in Oklahoma are those at or near Copan, Dewey, Bartlesville, Ramona, Skiatook, Tulsa, Red Fork and the now famouse Glenn pool.

A second oil-producing region lies 25 miles or more east of the ninety-sixth meridian, just east of the Verdigris river. This is usually known as the Coody's Bluff-Alluwe field. The area of the proved territory extends for 25 miles north and south, and is six to ten miles wide.

The third productive region is at Cleveland, some 25 miles west of the ninety-sixth meridian. The Cleveland field is small, not occupying more than half a dozen square miles, but it has produced a large amount of oil.

Besides the three regions just discussed, there are several localities in other parts of Oklahoma which have produced small quantities of oil or gas. A field near Morris, eight miles east of Okmulgee, which has been developed within the past year, shows promise of becoming a prolific pool. A number of good wells have been found near Muskogee. In various parts of the Osage Nation, west of the ninety-sixth meridian and between that line and the Cleveland field, both oil and gas have been found. At Wheeler, some 20 miles northwest of Ardmore, in Southern Oklahoma, a number of wells have been drilled which are reported to produce oil in paying quantities. Both oil and gas have been secured in small quantities at Gotebo, a town north of the Wichita mountains, in the southwestern part of the State. The same is true at Lawton and Granite.

Gas has been found in practically all regions where oil is produced, and in addition at or near Chelsea, Wagoner, Ponca City, Blackwell, Pawhuska, Bald Hill and several other localities, sometimes in paying quantities, sometimes in small amounts. The amount of gas varies greatly in the different regions. Wells yielding 5,000,000 to 10,000,000 cubic feet a day are common, and a few wells are reported to yield as much as 60,000,000 cubic feet daily.

The depth to the oil sand varies in different localities. The shallowest wells are those in the Coody's Bluff-Alluwe region east of the Verdigris, where the average depth is about 600 feet. Farther west, near Bartlesville, wells are 1000 to 1200 feet deep. Near Tulsa and in the Glenn pool the greater part of the oil and gas is found at a depth of 1500 to 1700 feet. At Cleveland the oil is found in a higher sand than at Bartlesville or Tulsa, but the depth is approximately the same as in these localities.

The greater part of the oil produced in Oklahoma is sold to the Standard Oil Co. or one of its numerous branches. There are a few small refineries in Oklahoma and Kansas, but most of the oil is carried by three pipe lines to the coast. One line runs north through the Kansas field, past Chicago and the Indiana field to the Atlantic coast. Two pipe lines run south from the Glenn pool to the Beaumont field and Port Arthur. In addition to the oil transported by pipe lines, a considerable amount is carried in tank cars, and a number of trainloads of oil leave the various fields each day.

It is impossible to even approximate with accuracy the amount of oil produced in Oklahoma, for the reason that all the oil from the Mid-Continent field, which includes both Kansas and Oklahoma, is grouped together. It may be of interest, however, to cite the following statistics for 1906: During that year the amount of petroleum produced in the world was, in round numbers, 214,000,000 barrels, of which 126,000,000 barrels were produced in the United States. The Mid-Continent field produced 22,000,000 barrels. It may be safe to estimate that two-thirds of this amount came from Oklahoma, and the production of the State for 1907 is perhaps a third to a half more than in 1906. In October, 1907, the Mid-Continent field produced 4,850,000 barrels of oil, and during the same month 467 new wells were completed in Oklahoma, which produced 46,658 barrels of oil daily.

There is no connection whatever between the oil of the Mid-Continent field and that found in other parts of the United States, notwithstanding the fact that the statement is sometimes made that if the Oklahoma oil field were raced far enough south it would finally connect with the Corsicana or Beaumont fields of Texas. This is a geological impossibility. Oil and gas occur in rocks of all ages, from those which are very old to the most recent. The oil and gas from the Mid-Continent field, which includes Southern Kansas, Eastern Oklahoma and the Fort Smith (Ark.) region, is found in rocks of carboniferous age, sometimes known as the coal measures. The greater part of the oil from Pennsylvania and West Virginia comes from rocks a little older than the rocks which contain the oil in Oklahoma. The oil from Western Ohio and Indiana comes from a very much older rock, known as the Trenton limestone. On the other hand, the Corsicana (Texas) oil is contained in upper cretaceous rocks which were deposited at a much later date than either the Trenton or carboniferous. The oil at Beaumont, Texas, and at Los Angeles, Cal., comes from a series of rocks still younger, known as the Tertiary. To state the matter in another way, the Corsicana oil comes from formations perhaps 20,000 feet higher in the geological scale than the oil in the Mid-Continent field, and the oil from Beaumont from rocks 10,000 feet higher than the Corsicana oil.

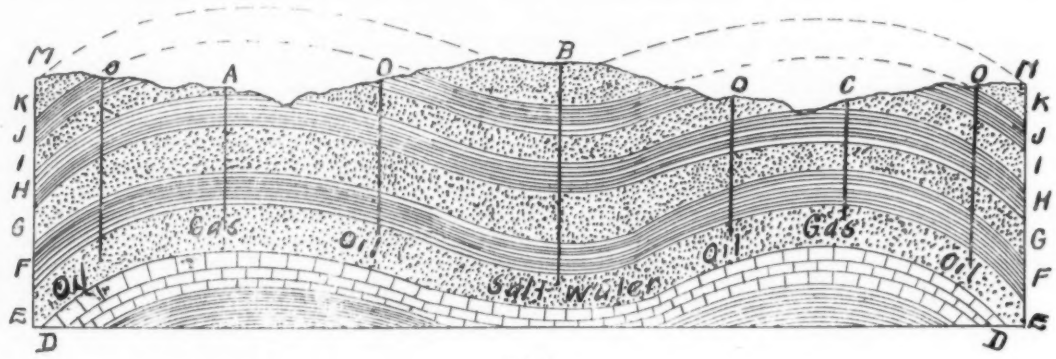


FIG. 1.

Geologists the world over are agreed that oil and gas are usually found in regions where four essential conditions of stratigraphy and structure are present. Whether the original source of petroleum is chemical or organic (and most geologists now accept the organic theory), experience has demonstrated that by far the greater part of all the oil and gas so far obtained in any part of the world has been secured in those localities where these four essential conditions occur, viz.: First, a rock forming a source of supply, from which the hydrocarbons have been slowly distilled; second, a reservoir rock or porous stratum, usually a coarse sandstone, which retains the substances; third, a cap rock, or impervious stratum, usually a dense shale, through which the oil and gas cannot pass, and lastly, an upfold or anticline in the rocks, under which the oil and gas may accumulate.

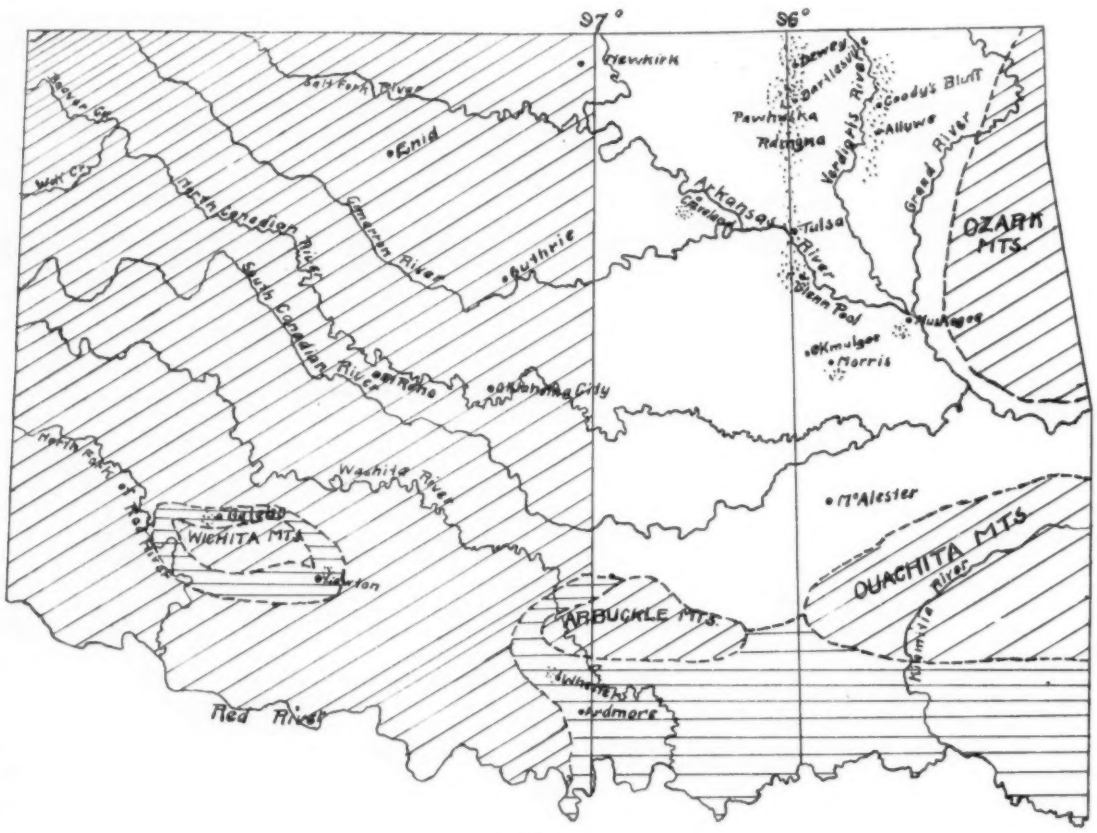


FIG. 2.

These conditions may be illustrated in the accompanying diagram (Fig. 1), which is intended to show a portion of the earth's crust consisting of alternating strata of rocks which have been folded, showing anticlines at A and C, and an intermediate downfold or syncline at B. The figure is also drawn, indicating that the top of the anticlines have been worn away by erosion along the line MN, leaving the syncline standing as a ridge. D is a rock containing fossils, the source of supply. E is a porous sandstone forming the reservoir, and F an impervious shale cap rock. If both oil and gas are distilled from the rock D and ascend into the porous sandstone stratum E contained under the impervious shale F, and if salt water is also found in the sandstone, then it naturally follows that the gas, being the lightest of the three substances, will tend to ascend to the highest possible level, and will collect under the summit of the anticline.

Following the law of gravity, the salt water, which is the heaviest of the three substances, will sink down to the trough or syncline. The oil will usually be found along the slopes of the fold between the anticlines and the syncline. The relative location of the three substances of the reservoir is represented in the diagram. It has been found, by experience in many regions, that if oil is desired wells should be drilled at O, intermediate between the summit of the arch and the lowest point of the trough. Gas will most probably be found at A and C. No drilling should be done in the syncline at B unless salt water is desired.

This, in brief, is the anticlinal theory of oil and gas formation. No one believes that the theory is infallible, for sometimes neither oil nor gas is found in regions where surface conditions appear favorable, and, on the other hand, a few oil and gas wells have been found in synclines. The fact remains, however, that careful investigations in a number of widely-separated fields not only in the United States, but in other parts of the world, has shown that by far the greater part of the prolific oil and gas wells are found along anticline folds.

This condition of stratigraphy and structure is present in Oklahoma. The greater part of all the oil and gas so far found in the State, perhaps nine-tenths in all, occurs along anticlines. It is a notable fact that a well-marked anticline extends for 75 miles north and south along the line of the ninety-sixth meridian, from Kansas to an unknown distance south of the Glenn pool. Another prominent anticline is found at Coody's Bluff, and there is good reason for believing that there is a low, broad arch in the Cleveland region also, although the structure is here more obscure and has not yet been definitely worked out.

The fact of great importance, however, is that anticlines, similar to those where oil has been produced, occur in many parts of the State where no drilling has yet been done. The rocks in the southern part of what was formerly the Creek Nation, as well as the northern part of the Choctaw and the southeastern part of the old Cherokee Nation, are known to be folded into a series of great anticlines and synclines, but practically no prospecting has been done in these regions. There are no reasons, judging from a geologic standpoint, why these areas should not contain as large deposits of oil and gas as the regions that have already been developed farther north. At the present time no one dares to predict what the future of the oil industry of Oklahoma may be, but it is at least safe to say that so far not one-fourth of the territory which will develop into prolific fields has yet been prospected, and not one-twentieth been developed.

There are, however, certain parts of Oklahoma in which there is little reason to believe that oil and gas will ever be found in paying quantities. During the past 10 years a large number of wells, perhaps nearly 100 in all, have been drilled in the rocks of red beds which occupy the western half of the State, but nothing of value has ever been found in this region. Other regions in which the chances for oil and gas in paying quantities are not good are the Ouachita, Arbuckle and Wichita mountains, in the southern part of the State, and the Flint Hills country east of Grand river, in Northeastern Oklahoma. Roughly speaking, the chances for finding oil or gas are not good west of the ninety-seventh meridian nor south of the northern limit of the Arbuckle and Ouachita mountains. As exceptions to these general statements the regions immediately surrounding the Arbuckle and Wichita mountains should be mentioned, for it may be possible to find considerable quantities of oil and gas just outside these mountains. A considerable field has already been developed at Wheeler, south of the Arbuckle mountains, and oil or gas have been found at Gotebo, Lawton and Granite, near the Wichita mountains. The locations of these various areas are indicated on the map, Fig. 2, which is intended to show, first, the developed regions; second, the probable limit of the productive field; third, the regions which may possibly contain oil and gas, and fourth, the regions where there is little hope for finding these products.

One matter which should not escape attention is the immense waste of valuable fuel now going on. Less than a year ago I saw in the Glenn pool three streams of oil, each as large as a man's body, flowing down the hillside and going to waste. The wells were flowing, the tanks were full, and there was no way to save this oil. Since that time means have been provided for preserving the oil. The same day I passed dozens of wells from which immense quantities of gas was escaping, in some cases several million cubic feet per day. It is no uncommon thing in any part of the oil region to see gas escaping from pipes burning all day long, for it is cheaper to let it burn than to take the trouble to turn it off. Such negligence is not short of criminal, for it must be remembered that the amount of these hydrocarbons is strictly limited, and when once exhausted they can never be replaced. The Government authorities, who have heretofore had the matter in charge in the oil regions, have done much to prevent waste, but much remains for the government of the new State to accomplish. If this fuel is properly conserved it will last for hundreds of years, but if permitted to go to waste it will be dissipated in a single generation.

In certain localities in Oklahoma gas is being sold at five cents per thousand feet for factory purposes and 15 cents per thousand feet for domestic purposes. At Fort Smith, Ark., where coal can be purchased for $3 a ton, the people prefer to pay 50 cents per thousand feet for gas for domestic use, because of the greater cleanliness and comfort in using gas. Gas is now being piped from the Kansas fields to Topeka and Kansas City on the north, and to Winfield and Wichita on the west. Muskogee, the second largest town in Oklahoma, gets gas from Ramona, 60 miles distant. Since the pipe line was installed gas in large quantities has been found within 10 miles of Muskogee. A pipe line has just been completed which carries gas from Tulsa and the Glenn pool region to Oklahoma City, and this line will soon be extended to supply a number of other towns in Western Oklahoma.

If care is taken to prevent waste there need be no fear that the supply will soon be exhausted. In my investigations of the Ramona-Tulsa-Glenn pool region I have been surprised to note how small a part of the gas-producing area has been drilled over. It is safe to say that the present consumption could easily be increased twenty-fold without seriously affecting the supply.

Oklahoma has a vast amount of coal, but if the State did not have a ton of coal the oil and gas, if properly utilized, would furnish sufficient fuel to last for many generations. At the present time no one knows the extent of the field or the amount of oil that may be produced, but judging from the present developments and the stratigraphy and structure of the rocks in regions yet undeveloped, one is safe in making the prediction that the Oklahoma oil field is destined to become the largest and most prolific field so far discovered on the Continent.

Vast Profits in the By-Products of Oil Production.

[Special Correspondence Manufacturers' Record.]

New York, December 30.

"Apparently, as one examines the map, the oil production of the country is drifting toward the South."

This incidental remark was made by a Standard Oil official whom I called on for data regarding one of the lines of the company's activities about which no detailed information has yet been published—the variety and extent of by-products from refining. While, on reflection, it will readily occur to anyone that the march of the derrick and the pipe line has been steadily to the South and Southwest from Pennsylvania during recent years, yet the dominating position the Standard occupies in the oil business of the world gives to this public acknowledgment of a patent but not thoroughly appreciated fact a new significance, and draws attention to a factor of tremendous potential importance in the development of the South.

Of how great a part oil may play in wealth production in the South some conception may be gained by a study of the magnitude of the Standard Company's operations. Without here attempting an elaborate description of all these operations, it may be stated that the full part the Standard Oil Co. has had in making the nation prosperous is but vaguely understood by the public at large. For Standard Oil is in reality a great manufacturing enterprise, converting raw materials into a multitude of finished products in widely-separated plants, located at the most advantageous points, employing an army of well-paid and efficient workers, 65,000 in the aggregate, in all the various branches; disbursing for wages and raw materials $100,000,000 or so every year; providing so ready and so steady a market for crude petroleum that prospecting in new fields and development of proven territory is kept at the active point; utilizing the various elements left after refining and creating a world-wide market not only for illuminating oils, but for previously neglected by-products as well, and by all its operations adding immeasurably to the wealth of communities and of the nation. As a creator of trade balances Standard Oil has played a most important part. For 1906 the total exports by this company amounted to $97,000,000, which was 60 per cent. of the company's entire output and 90 per cent. of all the export business of the country in oil and its by-products, and during the past 25 years the Standard Oil Co. has created a trade balance in favor of this country that totals all of $1,000,000,000.

A marvel of efficiency, the Standard Oil Co. has created an industry that comes into world-wide touch with every activity of civilized humanity, and it is a literal fact that the instant obliteration of Standard Oil would bring to a stop the commercial, industrial, educational, scientific, social, domestic and even religious machinery of communities and enterprises all over the earth. The giant steamships would stay tied up in their docks; the great engines of the industries would stand idle; locomotives, automobiles and even farmers' wagons could turn no wheel if the lubricants of Standard Oil were suddenly destroyed. There would be darkness in churches, halls, meeting places, shops and homes, in village, farmhouse and lonely camp everywhere in this land and to the uttermost parts of the earth were the oils and candles of the Standard Oil Co. to be at once wiped out, and even the sacred fires would fail at the altars. No wonder the people of the Standard believe in their misson and speak of their oil as the greatest agent of civilization the world has ever known.

Besides the enormous, expensive and altogether efficient machinery which the Standard Company has built up for the development of the business in this country, of which it controls some 80 per cent., the enterprise of the management has pushed the company's products into every corner of the world. Fleets of tank steamships—72 of them—with a score and more of cargo vessels, transport the oil and other products across the oceans and into foreign ports, and in addition to the tank wagons by which the oil is distributed in almost every community under the sun, Standard Oil is carried by pack train over the Himalayas, over the Andes, everywhere, to remotest places, if only a mule can travel the road.

Representing the company in foreign parts are men of the same forceful character as is found among those identified with Standard Oil at home. Returned travelers have related that in India, all over Asia, and wherever they visited, the Standard Oil agent was a man well known. The American consul, with his meager allowance and haphazard selection, might be unknown to whomever inquiry of him was addressed, but everywhere the Standard Oil representative could be named by every native of whom interrogation was made. He was a big, broad man, and his impress was plainly felt and seen.

The romance of Standard Oil—for no Arabian night tale has half the romance this history would possess—is yet to be written. About all that has been said of it lacks perspective, and most of it is as untrustworthy as an estimate of Gulliver had been if written by the Lilliputians. When the mental attitude of an overwrought people shall have steadied there may arise a man impartial and qualified to present not an attack nor a defense, but the simple history of the marvelous growth from nothing, within less than half a century, of an industry that has showed net profits of $83,000,000 in a single year; that covers the sea with its ships and the land with its equipment, and that ministers in some manner to the comfort of most of the people who inhabit the earth.

Beginning in Pennsylvania, oil production has spread to the South and West till the production of so-called Pennsylvania crude is largely confined to West Virginia, while practically all the West is supplied with oil from Indian Territory (now Oklahoma) and Kansas. Two-thirds of the Appalachian oil is handled by the Standard Company, as is practically all from the Oklahoma-Kansas field that is refined. Southern oil is thus largely the basis for the great operations of the Standard Company. The South would make a still larger showing in these operations were it not for the fact that inimical legislation has prevented the Standard from having any part in the development of the Texas field.

To transport its oil, in general bought from producers in the various fields, for the Standard seldom owns the wells, the company has laid 75,000 miles of pipe line. Through these lines the Oklahoma and Kansas oils are carried to the refineries at Sugar Creek (Kansas City) and Whiting, Ind., and may be transported all the way from the Oklahoma field to Bayonne, N. J., a pipe-line distance of nearly 2000 miles. Of the pipe-line mileage 8000 is trunk line of 8 and 12-inch pipe; the remainder, of two, four and six-inch pipe, are the feeders.

The 19 refineries are but the beginning of the Standard Company's operations in

manufacturing. While primarily illuminating oil is the occasion for the process of refining, and it is the largest product, the ingenuity of the Standard Oil men has converted to some useful purpose everything remaining in the still and has created a universal market for these by-products. Roughly classified, these are naphtha in the various forms and by the various names known to the trade; lubricants; petrolatum, which appears in the market as vaseline, etc.; paraffine, where the oil has a paraffine base, or asphaltum, which is the base of the heavy oils of California and Louisiana-Texas, and lastly, coke.

Without exception, every one of these by-products had to be rescued from the waste heap by the Standard Oil and introduced by slow degrees to the public. Naphtha, which is second in value and volume to the refined illuminating oil, is now almost exclusively used as a solvent in the industrial arts, for the manufacture of rubber goods, paints, varnishes, linoleum, etc. Its use by dyers and cleaners and for domestic purposes of lighting and cooking is everywhere familiar, as are the gasoline engines of small industries and automobiles. Because of the enormously increased use for naphtha or gasoline as a power producer, there was fear of a famine and restrictive prices, and this was one of the most effective points used in favor of the denatured alcohol legislation. And yet the time is only a few years gone by when anyone who would take an empty barrel to an oil refinery could have it filled with naphtha free of cost, and welcome to it!

Paraffine is another by-product now used in an infinite variety of ways, and bringing to the company $10,000,000 and more a year, which was formerly regarded as a nuisance. Twenty-five years ago, when a 10,000-barrel tank of it at the Cleveland refinery took fire and was entirely destroyed it was generally regarded as a very fortunate way to be rid of it. Then one of the men began experimenting with paraffine candles. It seemed a success. A first-class candlemaker, then without a location, was sent to the candlemakers of Cincinnati, Indianapolis, Chicago and elsewhere to introduce paraffine as a substitute for tallow. He was hardly given a hearing, and returning to Cleveland he announced that the Standard Company could introduce paraffice candles only by starting a factory of its own. The suggestion was adopted. Today the Standard Company uses 30,000,000 pounds of paraffine a year in the manufacture of 300,000,000 candles of 700 different kinds. They have driven both tallow and wax candles out of the market, so that other manufacturers buy 10,000,000 pounds of paraffine from the Standard every year. Standard candles are used for religious rites and ceremonies all over the world. Decorated and hand-painted, they are used for banquet, birthday and Christmas purposes, and guess candles, as an advertising medium, are made five feet long and weighing 40 pounds. Millions of candles for ordinary domestic use are made, and one shipment of miners' candles from Whiting for the Yukon made an entire trainload.

Besides the use of paraffine for candles, 2,000,000 blocks of refined paraffine are sold every year by the Standard and are used for an infinity of purposes. A liberal arrangement with a chewing-gum maker of Cleveland gave him the fundation for a million-dollar fortune, and the Standard Oil Co.'s paraffine also made possible the great success of the Uneeda biscuit. A big advertising campaign had been mapped out by the National Biscuit Co., but it was held up pending the discovery of a water-tight paper to protect the crackers from the effects of damp weather and moist climates. The Standard people solved the problem by immersing the paper in paraffine. The boy in waterproofs is the resultant familiar sign of Uneeda, and it is stated as a fact that a cargo of the Uneeda biscuit has been taken unharmed from a sunken vessel.

Paraffine was applied to Cleopatra's needle in Central Park when the surface of the obelisk began to scale off, and it stopped it. Stone fronts of houses are protected the same way, an application every three or four years being sufficient to prevent disintegration.

Paraffine is made into colored crayons, which will stick on glass as well as paper. Paraffine is used in laundries to whiten the clothes and in polishing the surface of starched pieces. It is used for sealing canned fruits or anything put up in bottles by home folks, manufacturers, druggists or chemists. It is used generally as a substitute for beeswax, tallow and sealing wax, and for insulating wires, and the bright young men of the Standard are suggesting some new use nearly all the time for this now exceedingly useful but some time wholly rejected article.

Of oils manufactured for lubricating machinery the Standard makes and sells between 3,000,000 and 4,000,000 barrels a year, which bring an average of $10 a barrel. There are hundreds of kinds of lubricants adapted to the various requirements of different sorts of engines and machines, ranging from sewing machines to thrashers and harvesters, from automobiles to locomotives, and from gas machines to ocean liners. The United States Steel Corporation uses 125,000 barrels of the Standard's lubricating oils in a year, and no kind of industry is absent from the list. For example, 25,000,000 pounds of axle grease is marketed every year. Harness oil, floor dressing and hoof oil are among the many kinds of oil produced.

Petrolatum to the amount of 12,000,000 pounds is sold every year, in barrels and half barrels only, at an average of two and one-half cents a pound. This is made into vaseline, salves and ointments by the manufacturing chemists, and into shoe polish, metal polish, etc., and is being experimented with for a great additional variety of uses. As a matter of fact, the Standard Company's efforts are being supplemented by those of many individual experimenters, so that the company doesn't know just how many uses its by-products are now being put to.

In oils having an asphaltum base, such as the California oils and to some extent those of Indian Territory, the asphalt residuum is used for paving and roofing, as well as for underground insulating and waterproofing for conduits. The whole Subway covering in New York is of this asphaltum.

Of coke, the last refuse in the still, all the carbon points used in electric arc lighting are made, and of it the carbon element in electric batteries is also made.

This, in outline, is the story of how the Standard Oil Co. utilizes the residuum from refined oil to such a remarkable extent that there is color of truth in the statement sometimes made that illuminating oil has now become the by-product of this gigantic manufacturing concern. The development of this branch of the Standard Oil Co.'s activities has certainly enabled it to reduce the cost of illuminating oil to a fraction of the former price, while processes of refining have been so perfected as to remove practically every sort of impurity, leaving an illuminant of wonderful light-making power.

Of other features of the Standard Company's enterprise more or less is known through various publications. How the Standard draws on its Southern forests for its boxes and staves; how it makes pumps, engines and tank cars; what ingeniously devised machinery is employed in making and filling cans automatically; how it has its own sulphuric-acid factory; how it manufactures stoves, lamps and wicks, thus fostering and extending the use of oil in every possible direction, and the system it has for marketing its wares throughout the world—all these are somewhat familiar illustrations of how thoroughly Standard Oil is organized for business. In every department there is the highest possible efficiency. In any output there are the profits of several businesses. By having the capital the company is enabled to build its various factories as well as the refineries at points where raw materials and everything else are most advantageously located. As a manufacturing enterprise and a commercial institution Standard Oil is undoubtedly the most remarkable example of American ingenuity and efficiency the world has yet known.

ALBERT PHENIS.

IMMIGRATION OPPORTUNITIES OF THE SOUTH.

By F. H. LA BAUME,
Agricultural and Industrial Agent Norfolk & Western Railway.

[Written for the Manufacturers' Record.]

Going back into the earliest historical periods, from the very dawn of history in Egypt, on down to the successive development and decline of the Phoenicians, Saracens, Greeks, Romans, Spaniards and our own ascendant nations of the present time, we are impressed with one unchangeable and persistent characteristic of the human family, and that is that they are migratory animals. To that quality more than any other is due the continued and always progressive development of the human race.

We have been witnessing during the past few years a proof of the above in the vast tide of immigration that has been surging through our doors. It has been a flood tide, long continued, and now within the past month the reaction has set in and the tide has begun to ebb, as evidenced by the very crowded steerage accommodations in every one of the European-bound ships of the transatlantic lines. It does not require a student of social economics to understand this movement back and forth. The laborer in the ditch and the newsboy on the street could explain it, perhaps, in words as effective, if not as voluminous, as the university man. It is a matter of bread and butter, and they know when those necessaries are curtailed.

We have been experiencing an unusual era of large prosperity. We hope it will continue, even on a modified basis. The reaction, however, has set in, as it always has done and always will do. There is a lesson to be learned, and it behooves us as thinking and reasoning citizens to apply it. A period of unprecedented prosperity always means a development and growth of our industrial and manufacturing centers. The large towns and cities are the first to feel the impetus of the forward movement, and as a consequence an ever-increasing proportion of our entire population gravitates toward them, and the ratio of the urban population is very greatly increased at the expense of the suburban and rural districts, resulting in a serious disturbance of the social equilibrium.

Just now is the propitious moment for some very effective campaign work in these industrial centers, and right here I want to say most emphatically that the South has not measured up to her opportunities in this matter. The hunger for land and a self-supporting home is inherent in every right-minded man, and there are thousands and tens of thousands of laboring people of small means scattered throughout the industrial districts of the North and West who are looking forward to the time when they can own a little self-supporting home of their own, and the only way on earth to reach these people is to go out to them and let them know what we have got to offer.

I took a trip out through Texas, Arizona and on out to the Pacific coast, then up through California, Washington, Oregon and Canada about two months ago. I had not seen the country for 10 years, and the development throughout that entire section was astounding. What is the secret of their success? I will tell you. The indomitable and unconquerable energy of the Western cosmopolite, the persistent and loyal enthusiasm born in their faith in the country and themselves, the unswerving loyalty to each other and the land in which they make their home, and an unshaken confidence backed up by all their resources. Under these conditions a veritable desert will spring into life and prosperity and abundance, and this has been demonstrated time and again all the way from Texas through Arizona to the coast and back through the deserts of California, Nevada and Utah. The railroads, the business men and the people's Legislatures throughout the West have realized for years the necessity of populating the rural districts and putting people out on the land to increase the productivity and the traffic of their section. Every inducement has been offered. The newcomer the moment he alights from the train is made to feel that he is among friends, that he is more than welcome, and that the community needs him and he needs the community. This broad-gauged welcome is the greatest factor of all in determining the decision of the stranger in a strange land, and he then and there makes up his mind to cast his lot with these people who show such a genuine interest in him and his. You can't get away from the spontaneous hospitality of the Western people.

Right here I want to say emphatically and sincerely that I believe, after having investigated the conditions throughout the West as they exist at this time, that no section of that vast territory offers the advantages to the agriculturist, horticulturist and the laboring man of limited means desiring to secure a self-sustaining home in the country that are offered by the South today. Yet the settlers and homeseekers are flocking into the West in thousands where we are not getting them in hundreds, and there must be a cause for the continuation of these conditions. Let us try and see what these causes are.

I had a couple of gentlemen in my office the other day, old friends who have been in the land business for the past 20 years, not railroad men, either of them, but carrying credentials from two of the large Western granger roads, and they had a proposition that simply could not fail to interest wherever presented. Let me outline it briefly, because it typifies the Western method of booming and settling up their territory. They had secured some 12,000 acres of cattle range in one of the large Western States. It was secured naturally at a minimum price, which is not necessary to mention. Ten thousand acres of it was divided up into five-acre tracts. Artesian water for irrigation was obtained at varying depths over most, if not all, of the entire tract. One thousand acres was held as a reserve home ranch of their own and the remaining thousand divided up into town lots, laid off into streets, and the contracts let for eight or ten buildings, comprising about half a dozen modern residences, on the most desirable of the town lots and half a dozen business houses in the business dis-

trict. The small farm plots were put on the market at the rate of $125 for each five acres, or $25 per acre, $25 down and $5 per month on the balance. A prominent business man was approached first in each town that these gentlemen visited and the proposition made to him that if he would assist them in inducing five of his friends to join a club and take five acres each they would pay his round-trip fare and all expenses to Texas as a committee of one for the purpose of investigation; that if everything stated in their prospectus could not be verified by him on the trip they would refund the amount he paid for his property. Their pamphlet and prospectus was the very acme of high-grade, artistic work and told in entertaining narrative, embellished with exquisitely tinted halftones, just how the settler could secure entire independence and future prosperity in the purchase of one of the five-acre farms for $125 that was capable under certain conditions of producing from $200 to $500 per acre yearly in fruit and early vegetables. Then another and inevitable inducement was offered—inevitable I say, because it is always present in the Western real-estate boomer's plan and prospectus. And that consisted of the privilege each purchaser had of drawing a town lot in the adjoining boom town and the possibility of securing one of the lots containing a residence costing from $2500 to $5000 or a business house valued at twice that price. It is the chance of getting a property worth from 10 to 20 times what is paid, in addition to a legitimate investment in a small farm, that appeals to the masses, and there have been millions of acres sold throughout the West on just these inducements.

Some two or three years ago I endeavored to induce some Virginia business men to take over a boundary of land which could be obtained at a price that did not begin to represent even one-fifth of its intrinsic value. I pointed out to them the possibilities of sale to settlers of small means and development by them on an intensive-farming basis. It was impossible, however, to convince them that there was anything much in it simply because our Virginia and Southern people generally have become so accustomed to their depreciated farm values that they do not realize the intrinsic values that are surrounding them if properly developed. About one year ago I induced a railroad friend to take this body of land over with me, to put it in the hands of an agency and develop it under my direction. The first settler moved on the place about one year ago. A little more than one-third of the land has been sold and the remaining two-thirds is practically clear profit. This can be accomplished almost everywhere throughout the South, where lands can be bought at an average price of from $5 to $15 per acre, and the sooner the business man of the South wakes up and realizes that his enduring prosperity, as well as the enduring prosperity of all the people, depends upon the agricultural development of his back country, then the sooner better things and greater material comforts and conveniences are assured to the South, which up to the present time is deficient in them. Right now, today, is the psychological moment for the inauguration of a systematic immigration, publicity movement covering the entire South. The large factories, furnaces and other industries in the North are to some extent curtailing their forces and considerable numbers of the employed are being thrown out of employment daily. There have been very serious mine disasters both in West Virginia and Pennsylvania within the past 10 days, and I am informed by people on the ground that these are material factors in the return of many of the foreign mining population who are helping to swell the number of those who are going back home on every outbound steamer.

By conservative estimate, if the present existing conditions continue, another 250,000 will leave these shores during the next three months. I am just in receipt of a letter from a prominent Hungarian in Chicago. Let me quote a few lines of it: "According to my opinion, no period during the last decade has been so advantageous for colonizing immigrants as the present one, caused by depressed industrial conditions. The previous years have been good. The immigrant has saved money and is willing and can afford to settle if he be given an opportunity and shown how and where he can do so to advantage. He has not much desire for his native country, for he knows conditions there are not becoming better, and the future is not brighter and not so promising as ours." The above is a concise statement of the situation as it applies to the foreign laborer of most nationalities in the North today. I have met them and fraternized with them in a business way both in Chicago and New York city, and I know that a large number of them—intelligent, industrious, progressive, law-abiding citizens—could be induced to come down and take over the cheap lands of the South if the proper methods were adopted for their permanent and satisfactory location. The alien is by nature an intensive agriculturist, and the slopes of our Blue Ridge mountains and the valleys between and also the level lands of our tidewater districts can be brought into the highest state of productivity if we will go after these people, giving them a warm and sincere welcome upon their arrival.

Every State Legislature in the South should set apart not less than $50,000 per year for the prosecution of this work and then should put it in the hands of a board of representative business men to see that it is dispensed effectively and economically. I am informed that one of our large Western States, through its Legislature and business men's organizations, spends over $500,000 yearly for advertising to the this—she has experienced a greater material development of her resources than any outside world her advantages and opportunities. And what is the result? Simply other Western States, and they are all of them going a pretty warm gait. Our Southern cities and large towns, most of them, have boards of trade or other business men's organizations and are striving with more or less energy to secure new industrial blood and greater development of their manufacturing and industrial resources. I tell you, Mr. Business Man, that the only way to secure permanent and lasting prosperity is to fill up the waste places in your back country. I believe I am perfectly safe in stating that three-fifths of the entire amount of available agricultural lands in the South is entirely idle and that the other two-fifths is not cultivated to the best of its possibilities. I want to reiterate that if we can get the people into this territory who will insure the cultivation of these idle stretches, then the prosperity of the towns and cities and their continued growth will follow in natural sequence. We make a mistake, some of us, in claiming that the foreigner would be a detriment to our civilization. Any family, any community or any nation that lives within itself and that is deprived of an occasional infusion of new blood is just as sure to retrograde and become impoverished, physically, mentally and materially, as is the live-stock on your farm when inbred for years without any attempt at improved breeding or building up by the introduction of new, virile blood.

Mr. Frank Sargent, our National Commissioner of Immigration, who, through his continued affiliation for the past 30 years with all classes of men, particularly in the laboring field, is thoroughly equipped to speak with conviction and knowledge, states that the enduring and redeeming feature of our American nation is its ability to assimilate the various nationalities who comprise the bulk of our immigration and to make good citizens of them. I have had prominent Southern business men tell me that they realize the vital necessity for more labor in our factories and on our farms, but that we do not want the so-called scum of European civilization, namely, the Italian, the Pole and the "unspeakable Huns." I only wish that it were within my power to take about 500,000 of these dark-haired races of Southern Europe and sprinkle them round among the hills and valleys and other inaccessible spots of the South. We want new settlers and new blood of any kind just as long as they are able-bodied workingmen who can take off their coats, roll up their sleeves and go out and assist in the development of our latent resources. There are numerous settlements in a small way throughout the South that testify to the ability of these people to work out their own salvation when given a chance. I don't care how ignorant the parents are, how little acquainted with our American ways, if they are non-criminal and are able-bodied and willing to work, then we can assimilate them, and even if we cannot change their sentiment and their method of living materially, their children will grow up imbued with a desire for better things and a determination to accomplish them. It is the immigrants' children and grandchildren that constitute the bone and sinew of American citizenship today, and we need more of those children in the Southland.

In summing up I want to give a few practical suggestions relative to the introduction of an agricultural population and the best means of securing it. Let the State Legislatures or the boards appointed for the purpose co-operate with the Southern business men and the railroads, and advertise our opportunities persistently and aggressively in the agricultural, trade and other papers. Then fit out attractive cars with samples of different products grown in the several localities, with plenty of attractive literature (and it can be made attractive more so than literature shown by any other section of the country if it is properly worked up), each car to have an attendant in charge and one or two assistants conversant with at least three or four of the continental languages. Then take this car up through the mining and steel-producing sections of West Virginia and Pennsylvania, up through the highly congested manufacturing centers of the Northeastern States and out through the populous farming districts of the Central West and the extreme West, and results will be bound to accrue. Induce the business men of the South who control, or can control, large bodies of land to divide same up into 5, 10, 25 and 50-acre tracts, sell them at a reasonable price and allow liberal time, if necessary, for payment of all but the initial payment, which should approximate from 10 to 30 per cent. Also, if possible, build small, comfortable cottages of three or four rooms, so that they can have a place to go to the moment they come down. That is a great factor in inducing homeseekers to locate. The little cottages can be constructed for less than $150, which includes good matched floors, tight and comfortable throughout and painted on the outside. I know, because I have built them for that price. Every town and city in the South could well afford to delegate three or four of its representative citizens and pay their expenses as a committee of investigation to take a trip and make the circle around from any of the Mississippi gateways, down through Missouri, Arkansas, Texas and up through California, Oregon and Washington, then back through Canada or any of the Northern States, Montana, Dakotas, Minnesota and Wisconsin, to familiarize themselves with what these virile, wide-awake and up-to-date Western people are accomplishing for their country. If we want to insure ourselves of the best results, we have got to get out and see what our neighbors are doing and thus profit by the awakened energies and broadened perspective which are sure to result from contact with outsiders. The South has greater opportunities and more latent possibilities undeveloped than any other section of the country today, and the Southern business man, manufacturer, citizen and farmer are coming to realize these conditions and are going to meet them, but what we want to do is to meet them now. Strike while the iron is hot. Thousands upon thousands of laborers, mechanics, clerks and other members of the great masses of the employed are today looking for self-sustaining homes in the country. Our inquiries are three times as numerous as usual at this season of the year, and right now is the time to get results and to start the nucleus that will mean much to our future prosperity.

Roanoke, Va.

Forest Perpetuation in Its Relation to Southern Water-Powers.

By JOHN H. FINNEY,
Associate Member American Institute of Electrical Engineers.

[Written for the Manufacturers' Record.]

The importance of the water-powers of the South, their magnitude, their economic value in the development of this section, their low development cost, their freedom from ice and snow troubles and consequent reliability, the ready and profitable market that eagerly awaits their development and their relative value when compared with the other sources of natural wealth of the South in its coal, iron and timber supply are not generally known or properly appreciated, even here in the South.

We of the South have been so busy in the last decade or two with the material progress and activities that have accomplished the evolution of the agricultural South into a splendid manufacturing section, have been so engrossed in our share in it and so accustomed to make the utmost use of our unexampled resources, that we have not given much thought to the real secret of our phenomenal progress. We are accustomed to speak of, to boast of and to think of our "inexhaustible" supply of raw material.

While our coal, iron and lumber have played, and coal and iron will play for many generations to come, an important and steadily-growing part in the continued progress of the South, as our lumber can also be made to do if forests are conserved, it is only to the South's water supply that the term "inexhaustible" can be truly applied, for with sane method in development and in forest perpetuation our water-power and our water supply will, like Tennyson's brook, "flow on forever."

In a general way the relation of forest covering and its functions to the areas containing them is understood by most people, and need not be enumerated in detail, but the vital effect of forests on climate, on timber supply, on agriculture, on water supply

and water-power is very dimly appreciated by the great mass of people; yet so intimately connected are the forests with the power and navigability of our streams that any discussion of either must take into consideration the essential features of both. There is a very serious and dangerous menace to this combined valuable asset of the South. A very real and impending danger to it existing at this very moment, and it is hoped that there can be uttered in this brief space a note of warning that the entire South may hear and heed at this time, when united action by the South can be made to result in warding it off forever.

Consideration of the matter first brings up the question of forests in their relation to our timber supply.

There is in the United States a total timber area of between some 500,000,000 and 700,000,000 acres (probably the smaller figure), containing between 1,400,000,000,000 and 2,000,000,000,000 board feet of lumber (again probably the smaller figure). These figures include every species of lumber wherever located, and can be considered our total asset of timber. Of this 500,000,000 to 700,000,000 acres, 10,000,000 acres are annually lost by forest fires, so, if we did not cut a stick and forest fires continued at the present rate, we would have no forests at the end of 50 to 70 years.

We are, however, using timber at a most extravagant rate, and in no way can the prevailing extravagance of the American people be better shown than in our timber consumption, which is at the enormous amount of 440 board feet per capita per annum. This gives us a yearly cut of at least 40,000,000,000 feet in the form of lumber, and as much more perhaps in other forms, such as railroad ties, pulp for paper, cooperage, etc. Conservative estimates indicate that our present consumption of timber in all forms is equivalent to at least 100,000,000,000 board feet per annum, and probably more, and fix 20 years as the probable total life of our timber supply.

The Southern States have nearly seven-tenths of the forested area of the United States, more than 25 per cent. of which has already been stripped.

The Appalachian range, extending from North Georgia into New England, is the natural home of our native hardwoods, and about the only remaining source of hardwood supply. We have in this range about 75,000,000 acres on which hardwood trees can be grown as an agricultural crop, of which area probably four-fifths, or 60,000,000 acres, is in a cut-over or culled condition. This soil will bear no other crop than trees, for the habitat of the hardwood is on the precipitous slopes of the mountains and at the highest altitudes, on ground totally unfitted for farming purposes. Twenty per cent. of our hardwoods has already been cut, and cutting continues at a rate as rapid as modern mills and lumbering operations, commanded by vast aggregations of capital, can do it.

The end of our hardwood supply is in sight, the Forest Service estimating its entire exhaustion in 16 years.

It can be seen by this passing glance how richly the South is endowed in this asset of timber and how grossly and criminally we are misusing it.

The matter has a more serious bearing when forest influences are considered in their relation to the water supply of our Southern streams. The forest coverings at these headwaters influence our streams in manifold ways; first, by mechanical action of trunks, limbs and leaves, they break the fall and shatter into particles the raindrops; second, the forest floor, consisting of humus, moss and debris, is a natural filter forcing the water to soak in and seek subterranean drainage; third, the roots serve to bind the soil, preventing erosion, besides assisting in the slow percolation of the rainfall, and fourth, the cooler atmosphere of the forest retards what would be, under other conditions, rapid evaporation. Forests thus serve to hold back the torrential rains and have caused our Southern streams to have one appreciable advantage in the even run-off for which they are noted.

All of the important streams south of the Ohio river in the Mississippi, Gulf and South Atlantic drainage area have their headwaters in the Appalachian plateau.

This plateau, embracing approximately 10,000 square miles, receives the heaviest rainfall in the United States with one exception, being from 50 to 70 inches annually, sufficient to make a lake four feet deep over an area equal to the entire States of Rhode Island, Delaware and New Jersey, and is the natural reservoir, formed by the forests, that supplies, replenishes, conserves and tends to make uniform the flow of our Southern streams, giving to them in their course to the sea an amount of power estimated at between 3,000,000 and 4,000,000 horse-power. This forest covering has heretofore prevented severe and damaging flood periods and long drought and low-water periods.

This condition is, however, rapidly changing, and to a startling degree, for the deforestation already accomplished has in the past few years done incalculable damage by floods (in 1901 and 1902 $18,000,000 in the South alone), and is rapidly changing the character of and irreparably damaging the power capacity of our streams.

A prominent Southern engineer, Mr. W. S. Lee, estimates that deforestation already done has cut down the capacity of our streams not less than 40 per cent. This is entirely due to the longer and more damaging flood periods, which have made necessary excessive costs for dams sufficiently heavy to withstand them, besides giving longer drought periods, decreasing at such times enormously the minimum flow of the river on which, without artificial reservoir capacity, the power development must be based.

When one considers the splendid contribution to the industrial South that has been made by its power plants and the economic value which they mean to our mills and manufacturing interests, which value grows more important and far-reaching each year as coal becomes scarcer and dearer, one can get some idea of the importance of forests to this industry and through them to the entire South.

In the Carolinas and Georgia there is invested in cotton mills run by water-power, or by electric power generated from water-power, alone over $40,000,000 at the present time, and but a bare beginning has been made in electrical development.

Such enterprises as the Virginia Power Co. at Richmond, Southern Power Co. at Charlotte, with its transmission lines reaching hundreds of miles in every direction; Savannah River Power Co. at Anderson, S. C.; Columbus Power Co. at Columbus, Ga., and many other similar developments are splendid examples of engineering skill and business enterprise. Forest perpetuation means their salvation and their extension and growth, and it can be truly said that upon the forests depends the future of cheap electric power in the South.

Three million horse-power, when developed, would mean an investment in hydro-electric plants of upwards of $300,000,000, earning annually $60,000,000 at a conservative estimate, and saving the South on its coal bill alone some $15,000,000 to $20,000,000.

Apart from the menace to our water-powers, there exists, through the same causes, a very real danger to the water supply of our cities and towns from both the standpoint of quantity and quality; our streams are not naturally silt-bearing, but their condition and appearance now, contrasted with their condition a short 10 years ago, presents a marked change. Ten years ago they were clear and remarkably free from sand and debris; now they are full of sand, silt, detritus and washings, which have filled up the channels and which increase enormously the expense and difficulty of purification, so that many cities now face not only a shortage of water during the rapidly lengthening drought periods, but unknown dangers in what they do get. As an example, the city engineer of Augusta, Ga., states that their power canal has received more silt and sand in the past 18 months than in all the 30 years previously.

If this is the case with 20 per cent. of the forests gone, what will be the plight of Augusta and other cities similarly situated when the remaining 80 per cent. of forests is cut?

This sand and debris, after filling the upper portions of our streams, finally washes to the slower waters of the navigable portions and is swiftly filling them up, making navigation dangerous, if not impossible, and making dredging operations necessary on a large and ever-growing larger scale each year.

It can be safely stated that the amount which will in the near future have to be paid in one year for dredging, jetties, harbor work, etc., in our Southern States would pay the total cost of a national forest area that would remedy the trouble for all time. Surely at this time, when our transportation facilities are manifestly inadequate; when our entire country is calling for and insisting on the relief that canals and improved waterways only can afford; when large appropriations for these purposes must be made, it is well to call attention to the only effective remedy for curing the disease, by going direct to the seat of the trouble.

This is not a sectional matter, but is of national importance, the necessity for action on which has been seen and urged by clear-headed men in all sections of our country. The baneful effects are too apparent to be longer ignored. The increased flood damage each year at important points, such as Cincinnati, Pittsburg and other Northern cities, is as directly traceable to deforestation as are our flood damages here, and self-interest on the part of ourselves and our statesmen, if no stronger or more patriotic motive exists, should demand that the remedy be applied.

This remedy is forest preservation, or, as better expressed, "forest perpetuation," under the care and guidance of the National Government.

Forest perpetuation means the scientific planting, growing and harvesting of trees in an area set aside for that purpose, raising them as we would raise a crop of cotton or corn. It means the careful cutting of trees that are fit to be cut, the protection of the young trees, the prevention of forest fires, the conservation for all times of our timber supply and of our water supply. That these things can be done is proved by the forest reserves of Germany, Austria, France, Switzerland and other foreign countries, where not only are these purposes carried out, but carried out on a profitable scale to the State. It has been demonstrated in some of these phases here in America, where the National Government has created in recent years vast timber reserves, or national forests, in the West, embracing some 150,000,000 acres, which protect important watersheds in that section and ensure there a perpetual timber supply.

No one now questions the wisdom of this splendid national domain, but not an acre is in national forests in the East or South, although the necessity for it is even more apparent and more pressing than in the West. Here the situation is different, of course. In the West the lands thus set aside were public lands. In the East the forests are owned by private individuals or corporations, and many of the latter being wealthy lumber companies engaged in active lumber operations, it is necessary, therefore, if a forest reserve is to be made that the Government should acquire by purchase the proposed area. In the pending Appalachian bill it is proposed to so acquire an area of 2,000,000 acres, or as much more as may be necessary to protect at once the South's watershed—land that is more suitable for tree-growing than for farming, which area shall be for all time devoted to forest purposes under scientific direction and skill. It is planned to acquire additional areas, where possible, in other watersheds in the Appalachian range, and the groups thus set aside, together with the privately-owned lands whose owners can be induced to practice scientific forestry, will ensure in time our timber supply perpetually.

A few words might be said here regarding the effect of the national forests on the people. The establishment of the Southern Appalachian forests is intended, like those in the Western States, to be for the benefit of the people. Perpetuation through rational use is the keynote of the Government's plan.

It is proposed to purchase rough land, or cut-over land, which is suitable only for forest purposes, whereever it can be cheaply bought within the area desired.

The bill before Congress provides for securing land only by direct purchase from the owners, so that no one need sell unless it is his desire to do so. No person could be forced to give up his land or his home, but if he wishes to sell, and the price is reasonable and the land is forest land of the character desired by the Government, it would be bought for cash in the same manner as if by a lumber company. The object of the national forests is to make homes and mountain farms more valuable, not to destroy them, and would operate not to the detriment of the people in the region where it is proposed to locate a reserve, but to bring to them substantial and direct benefits.

The timber in the forests will be managed in such a way that the trees suitable for cutting will be cut; that local industries and local users of wood will be given preference in securing this timber over outside buyers; that good roads will be built into the forests to enable the timber to be properly harvested, these roads being always open to the people, and that grazing would be permitted, as in the West, upon the payment of a small fee for each head.

It would give employment to a large number of people in the building of roads, in getting out the timber, in patrolling and protecting the forests, in planting trees and in caring for them.

In lieu of the present State and county taxes on forest lands (which State and county taxes will eventually be entirely eliminated under present timber methods), since the Government pays no taxes, a provision is made in the bill to reimburse the counties affected by the forest reserve by giving them for school and road purposes 10 per cent. of the gross receipts from the sale of timber or any other income from the forests.

This surely seems to be a sane, fair and impartial plan. It is eminently practicable and profitable alike to the State and nation. In it lies our salvation from the calamities and evils that now confront us, and it behooves every patriotic Southerner, every

man who has his own best interest and the interest of his children and the interest of the South at heart, to help on to the utmost of his ability the bill now before Congress for action at the present session, which, if passed, will conserve this splendid heritage of the South.

It is a time for action, for real militant energy and interest by all the people until the matter is an accomplished fact. We can accomplish it, however, only if the South wakes up to a realization of its real and vital importance.

The cost of it all? A little hard work for the next month or two on the part of believers in the South, plus about the price of one first-class battleship.

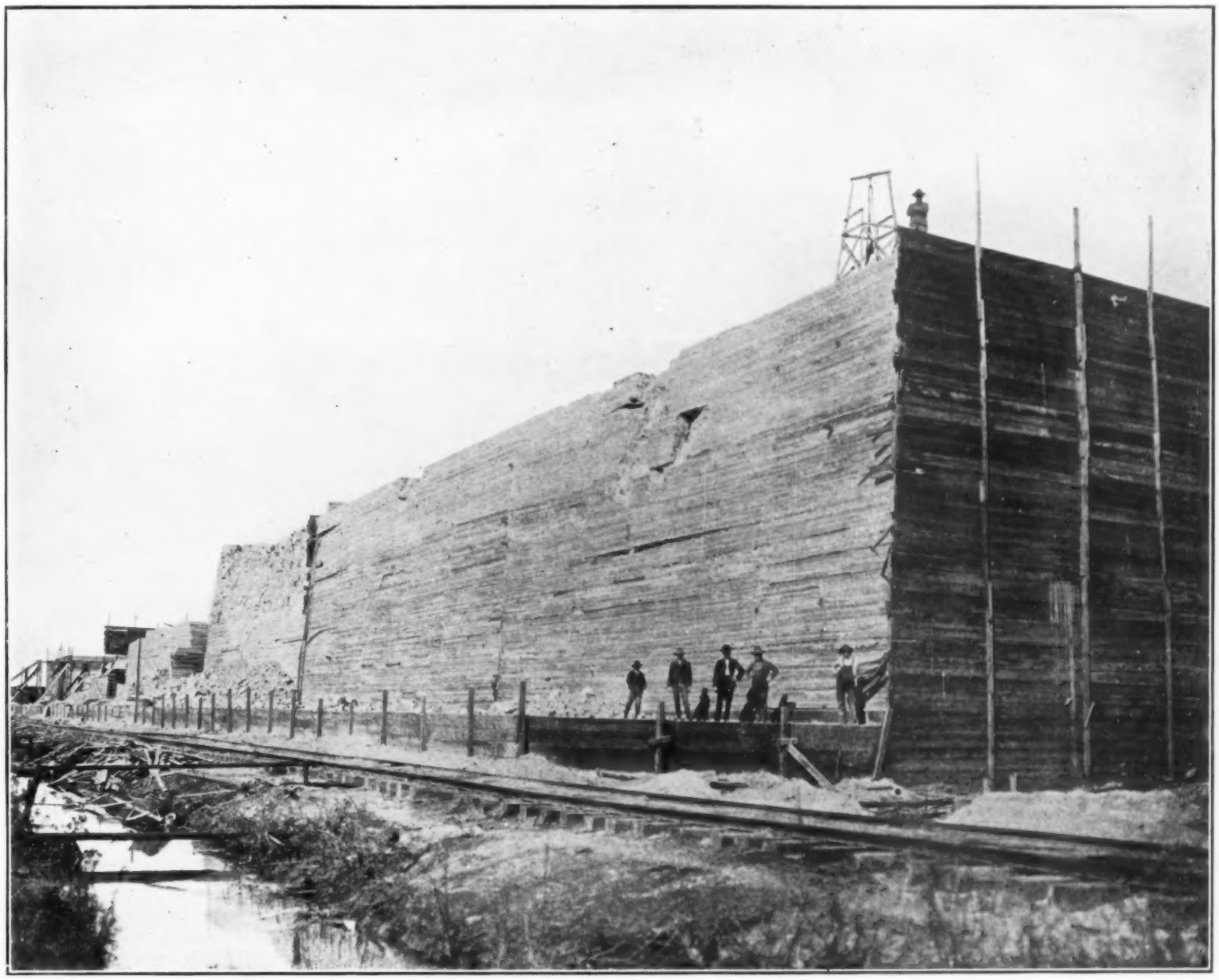
Louisiana's Domination of the World's Sulphur Trade.

[Special Correspondence Manufacturers' Record.]

New York, December 30

The South, through the operations of the Union Sulphur Co. in Calcasieu parish, Louisiana, is today dominating the sulphur trade of the world, and is in position to dictate the price at which sulphur may be sold not only in New York or any other American port, but in any part of the world. Until yesterday, it almost seems, the sulphur mines of Sicily had a century-old monopoly of the world's trade. As late as 1903 there were imported into the United States 175,000 tons of Sicilian sulphur, of a value of about $4,000,000, with not one ton of American sulphur shipped out, while in this year of 1907 the mines of Louisiana have produced a supply sufficient for all the requirements of the United States, with 17,000 tons for export besides. The very existence of the Italian Government-backed sulphur industry, with its crude methods and horde of starveling sulphur mines, is thus threatened, and there are economic and political elements involved that provide an international situation of deep and even tragic significance.

In this first complete story of the Louisiana sulphur mines that has yet been written, attention may at once be given to the popular error that the Union Sulphur Co. is an offshoot or branch of the Standard Oil Co. Not that, if it were, any apology need be suggested as in order to those who have any real knowledge of the operations of the Standard Oil Co. or any conception of the part that superb organization has played in the development of American commerce and industry. Simply in the interest of historical fact, and to give credit where credit to an extraordinary degree is due, it should be understood that the Standard Oil Co. is not now and never was interested in the Union Sulphur Co. in any form, shape or manner, either directly or indirectly. Mr. Herman Frasch, the inventive genius who evolved the remarkably unique plan by which the sulphur is liquified and pumped from a depth of 1000 feet or more, is president of the company, and he, with H. McK. Twombly, also of New York, owns the controlling interest. Ninety per cent. of the stock of the company is owned by Mr. Frasch, Mr. Twombly, the Abram S. Hewitt estate, the Edward Cooper estate and Mr. L. H. Severance. The confused condition of the public mind as to the ownership of the property evidently arises from the facts that Mr. Frasch, long identified with the oil business in this country and in Canada, was at one time a chemist in the employ of the Standard Oil Co.; that in the first syndicate owning the lands of the Sulphur Company Frank Rockefeller and F. B. Squire were associated with Mr. Frasch (by reason of his giving them some of the shares of stock, by the way), and that L. H. Severance, who bought Frank Rockefeller's interests at the same time that Frasch bought out Squire, had been connected with the Standard Oil Co., although he had had a misunderstanding with that company and had left it some 12 years ago. Messrs. Rockefeller and Squire had relinquished all their interests in the enterprise before it had passed out of the unprofitable experimental stage. This unprofitable experimental period had stretched over nearly 11 years of time, and it was not until 1903 that the company succeeded in producing sulphur at a profit.



A GREAT MASS OF SULPHUR IN ITS TEMPORARY STORAGE.

Also, as bearing on the myth of Standard Oil ownership, it is related that the first experimentation on the sulphur-mine property was made on the theory that petroleum would be found beneath the slightly elevated mound where borings were first made. The first great gusher on Spindletop at Beaumont was not accidentally stumbled upon, for it had long been considered certain that oil in large quantities would be found in the Louisiana-Texas coastal country, and intermittent prospecting had been carried on for a good many years. Instead of petroleum, however, a deposit of sulphur was encountered at this point near Lake Charles, where the sulphur mine is now in operation. While the value of the strike was fully realized, and efforts at exploitation were early made, an intervening bed of 200 feet of quicksand baffled every attempt to sink a shaft into the sulphur deposits. Numerous successive companies, between the discovery of the sulphur deposits in 1868 and the acquisition of the property by Mr. Frasch in 1894, had made disastrous attempts to produce sulphur. Before acquiring the property Mr. Frasch drilled quite thoroughly over the territory, and had definitely located the boundaries of the deposit and demonstrated the character and nature of the formation. It appears that the sulphur lies in the cone of a vast extinct geyser, where it was deposited as far back as the tertiary period. The sulphur, embedded with limestone in proportions of 70 per cent. sulphur and 30 per cent. limestone, extends 1100 feet downward

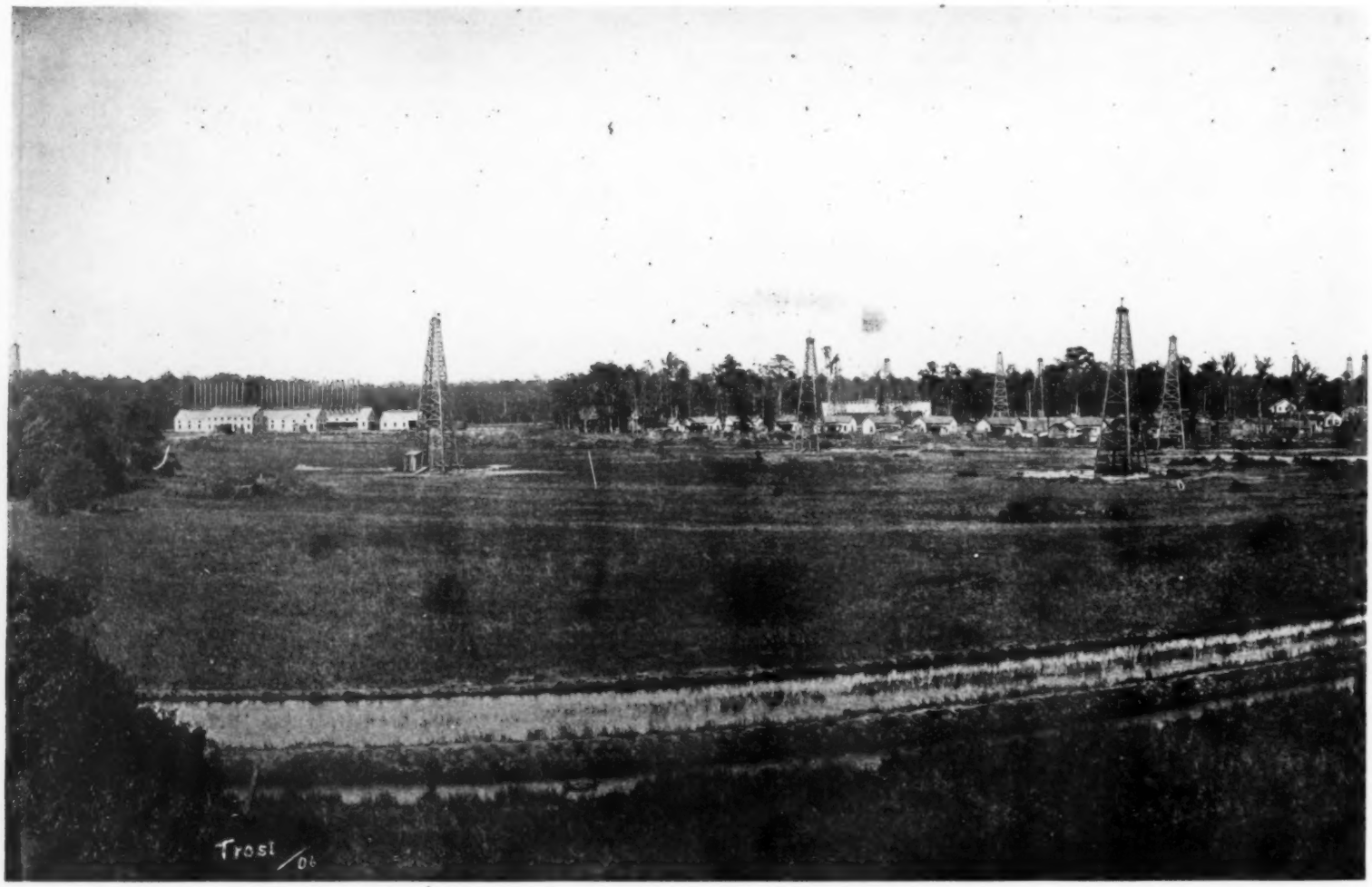
from the lips of the cone to a deposit of gypsum. The mouth of the cone is from one-third to a mile across.

It took years of costly experimentation, even after the Frasch interests had secured the property, before his process was perfected. Briefly, the Frasch process consists in drilling a well, much as an oil well is drilled, to the bottom of the sulphur bed. Into the well a series of four pipes is then driven. The outer casing is a 10-inch pipe. The others are six, three and one inch. Between the ten and six-inch pipes superheated water of a temperature of 335 degrees is forced. From two to three feet above the bottom of the well there are perforations in the pipe, through which the heated water forces its way into the sulphur bed, liquifying it to as great a distance as the water retains the temperature required to melt the sulphur. The melted sulphur, dropping to the bottom of the well, flows up the space between the six and three-inch pipe, and is brought to the surface by compressed air forced down the one-inch pipe.

The sulphur comes to the surface 99½ per cent. pure, and it is only necessary, therefore, to put it in shape for shipment. As it comes from the wells it is allowed to flow into large open bins 250 to 350 feet long, with a depth of 40 to 50 feet. As it cools the mass solidifies, so that, in shipping, it is necessary only to knock down the boards forming the sides of the bins, break up the mass into forms convenient for handling and load into the cars which have been switched onto the spur tracks that skirt each bin.

it would seem that it must revolutionize and dominate the business of the world. The Louisiana company has made sulphur contents the basis of quality, instead of "best unmixed seconds," the previous ambiguous standard, which is said to have meant that some of the Sicilian producers would mix as much dirt with the sulphur as the customer would stand, and that the term never did guarantee any percentage of sulphur contents. The American company's product is sold with a guarantee of 99½ per cent. pure sulphur. In the matter of marketing the revolution is not less marked. The company has a fleet of ships, owning one and chartering the others. Shipped by rail from the mines to Sabine Pass, the sulphur is loaded onto the ships by machinery, doing in six hours what formerly required six days, and it is then shipped to various storage stations along the coast, so as to be convenienct to the trade. The ports at which storage has been provided are Baltimore, Philadelphia, New York, Boston, Portland, Three Rivers and Quebec. The trade can be furnished with such carload lots as may be desired, another convenience not hitherto provided, as it was necessary previously to buy portions of cargoes or cargo lots.

The principal users of sulphur are manufacturers of sulphite pulp, gunpowder, rubber and general chemicals. For the manufacture of sulphuric acid for fertilizers it seems that pyrites is most generally used, it being stated that the same plant working on sulphur will make 20 per cent. more acid than if working on pyrites. The Union Company sells only to the wholesale trade, and has secured the whole trade of America.



BIRD'S-EYE VIEW OF UNION SULPHUR CO.'S OPERATIONS IN LOUISIANA.

There are some 30 derricks on the grounds. The wells are sunk 50 to 100 feet apart. One well will produce as high as 400 to 500 tons in a day, keeping up a steady flow for weeks at a time, and there is a record of 60,000 tons of sulphur from one of the wells. To provide the enormous quantity of superheated water required in the production of the sulphur a battery of boilers with a total of 24,000 horse-power capacity has been installed.

As a Southern industrial enterprise, the sulphur mine would be of unusual interest apart from the novelty of the process employed and the important position it occupies as an element in the development and prosperity of the South and the prestige it gives in its way to the entire American nation. Modestly capitalized at $200,000, the company disburses from $150,000 to $180,000 a month for labor, supplies, etc., in Calcasieu parish. From 600 to 700 laborers are employed at the mines. They are a well-paid and well-cared-for lot. Drillers get $5 a day and helpers $2.50. (In the Sicilian mines they get 20 to 30 cents a day.) There is no company store. A boarding-house, run by the company as a public necessity, is not paying the expenses of running. The company has built a schoolhouse and supplied teachers for the benefit of the workmen's children. An artesian well has been sunk and a drainage canal dug, and although the town of Sulphur Mines is located in a swamp, there is no malaria or ague. Compared with conditions in the sulphur mines of Sicily, the Louisiana sulphur camp is a veritable paradise. In Sicily the sulphur is mined, and by hand. The workmen go down into hot pits and chambers filled with stifling fumes and carry 40-pound loads of the sulphur in baskets on their backs up as many as 180 feet of steps or ladder. Hundreds of the workmen are boys. Many of them are in such depths of poverty that they have to be paid their wage of a lira or lira and a half at the end of each day's work in order to live through the morrow. At the Louisiana mine the work is all above ground, all the mining is done by machinery, and the whole community is prosperous and wholesome.

The Union Sulphur Co. has revolutionized the sulphur business of this country, and

Just what will be the various stages of the apparently inevitable world competition with the Sicilian sulphur it seems impossible to foretell. With present methods of mining, and in view of the fact that reductions in wages are apparently impossible, it is declared the Sicilian product cannot be lowered to a point that will bring it into successful competition in America with the sulphur of Louisiana. The appearance at Marseilles of 3000 tons of American sulphur in the fall of 1904 opened the eyes of Italy and Europe to the competition which had suddenly come into being, and there has been acute international interest in the situation ever since. The Italian Government has had representative on the ground to ascertain the exact conditions, and he has conferred with Mr. Frasch, at the instance of that Government, to see what means might be adopted to save the Sicilian industry from paralysis.

Unquestionably a grave crisis has been precipitated by the Louisiana development. The Italian Government has felt impelled to take the situation in hand, following the recent expiration of a contract by which, for 10 years, an English company, the Anglo-Sicilian, handled the entire output of the Sicilian mines. With an accumulated stock of some 500,000 tons of sulphur, with a capacity for production of some 450,000 tons a year and present exports of less than 400,000 tons a year, it is evident that a very difficult problem presents itself. The Government-backed Consorzio Obligatorio, an obligatory trust compelling every Sicilian producer of sulphur to sell his product through one channel and at a fixed price, became operative in August, 1906. Up to the present time it has been necessary for the Italian Government and the Bank of Sicily to advance some $11,000,000 to the Consorzio in order to take over the accumulated stock of sulphur of the Anglo-Sicilian Company and make advances to the mine owners and producers. An attempt by the Italian Government to reduce the percentage of money to be thus advanced brought on a general strike of 100,000 workmen in September of this year, so that the former artificial stimulus is still supplied.

It would seem to be an economic impossibility for the mines of Sicily to loosen the

hold the Louisiana company has secured on the American market, in view of superior quality and advanced methods of supplying the trade. In Rome, so the statement is made, a representative of the Union Sulphur Co. was told that the United States Government would like to see Sicilian sulphur shipped to America, and it was intimated that the resources of the Italian Government might be employed to put the Union Sulphur Co. out of business. Two cargoes of Sicilian sulphur were sent over. The Union Company cut the price $2.62 a ton in America and exported 17,000 tons. No other shipment has been made to this country from Sicily this year. The Union Company has announced its intention of invading the European market in case any further assaults are made on its American trade. The price of Louisiana sulphur has been $22.50 a ton. The Sicilian prices in former years were $22 to $24 a ton. The recent shipment was offered at $20. The Union Company cut the price to $19.50.

With its enormous stock of sulphur and the prospect of starvation, rioting and bloodshed in case of an interruption of the sulphur industry, it is difficult to see how Italy can stay out of the American market. Yet a war of rates here would result in a determined invasion of Europe by the American company, it is declared, with results that might be even more disastrous to the Sicilian industry in the final wind-up; for the American company is seemingly content to stay out of Europe just now and refrain from doing anything that would undoubtedly increase the hardships of the already miserable Carusi who toil in the Sicilian mines.

ALBERT PHENIS.

BIRD'S-EYE VIEW OF UNION SULPHUR CO.'S OPERATIONS IN LOUISIANA.

THE IRON TRADE OF THE WORLD

With Special Reference to the Conditions of the United States.

By J. STEPHEN JEANS,

Secretary to the British Iron Trade Association and Editor-in-Chief of the *Iron and Coal Trades Review*.

[Written for the Manufacturers' Record.]

The manufacture of iron and steel is at all times an anxious trade. This no doubt is true of all industries to a greater or less extent, but few have displayed such a remarkable and inexhaustible capacity for springing surprises, and of few can it be said that the future can be slightly foretold with any assurance. This psychological feature, more or less characterized at all times, has never been more so than at the present time.

All the world over the year 1907 opened in the iron trade not only with good hopes, but with confident and even buoyant expectations. The year 1906 had been one of the best that the trade had ever known, and the output of all its products, without exception, had exceeded both in value and in volume that of any previous 12 months. The experiences gained by the trade during the years 1905 and 1906 had justified the commonly-expressed belief that the ironmaking world was in for the greatest and longest boom it had ever known. That belief was not in the least shaken until well into 1907. In most countries the conditions of output did not begin to fall to pieces until well after the first half of 1907 had run its course.

The World's Iron Trade in 1907.

The circumstances of the iron trade of the world during the last two years, fruitful as that trade has usually been in surprises, has quite thrown out all previous experience and calculations and left the industrial world standing on the verge of the unknown and the apparently unknowable. Up to a few years ago there was not so much uncertainty as to what to expect in the development of the world's iron industry as there has since been. The progress achieved was not exactly steady, but the fluctuations were within tolerably narrow limits. It took 80 years of the nineteenth century to bring the production of the world's pig-iron up from less than 500,000 tons to 25,000,000. Since then the world's iron output has increased at a greatly more rapid pace, so that the output for last year was close on 60,000,000 tons, and the output of 1907 is likely to be somewhat over 60,000,000 tons, and may be near to 62,000,000. The striking feature of this advance is the fact that between 1904 and 1906 the three principal countries—the United States, Germany and Great Britain—increased their total output by 13,446,000 tons, the figures having been as under:

	Production of Pig-Iron.		
	1904.	1906.	Increase in 1906.
United States	16,497,000	25,307,000	8,810,000
Germany	10,104,000	12,422,000	2,318,000
Great Britain	8,563,000	10,149,000	1,586,000

In a number of other countries the advance made was considerable, but nothing like that achieved by the three countries above named, which are, and promise for many years to remain, the greatest ironmaking countries in the world, producing unitedly in 1906 over 48,000,000 tons of pig, and leaving less than 12,000,000 tons to be produced by all other countries unitedly. None of these countries can be regarded as making great headway. France is inclined to make more rapid advance than any other, but it has always been a trade characteristic of this nation that it makes haste slowly, and her output of 3,319,000 tons in 1906 was not much over one-fourth that of Germany, nor one-seventh that of the United States. Russia actually produced less iron in 1906 than in 1904 or in 1905; the Austrian iron industry remains comparatively stationary; Belgium, with no iron fields of her own worth anything, does not and cannot be expected in the future to attain much progress, and so also with Sweden, whose resources are limited. In short, Canada is the only outside country of which at present good expectations are entertained.

It must be the ultimate aim of the great ironmaking countries of the world not only to retain their own domestic trade, which is attained mainly by stiffening and strengthening the tariff walls which are built around about their ports, but in the long run to secure as large a slice as possible of the trade of the rest of the world. The resources of production have been so greatly increased, more especially in the United States, Germany and Great Britain, that it would be unreasonable and improbable to expect that the home demand can in ordinarily dull times keep them anything like fully employed. The United States, which supplies the best illustration for the purposes of the argument in hand, could hardly be expected to maintain an advance of output to the extent of some 9,000,000 tons within two years, when the advance in itself was about equal to the whole American consumption of iron so recently as 1890, and was even greater than the total United States consumption of some subsequent years. When the home demand fails, as it must do again, although no doubt more or less temporarily, the question on all men's lips will be, What can we do to keep our works employed?

The World's Demand for Iron.

There is an increasing demand for iron and steel on the part of countries that do

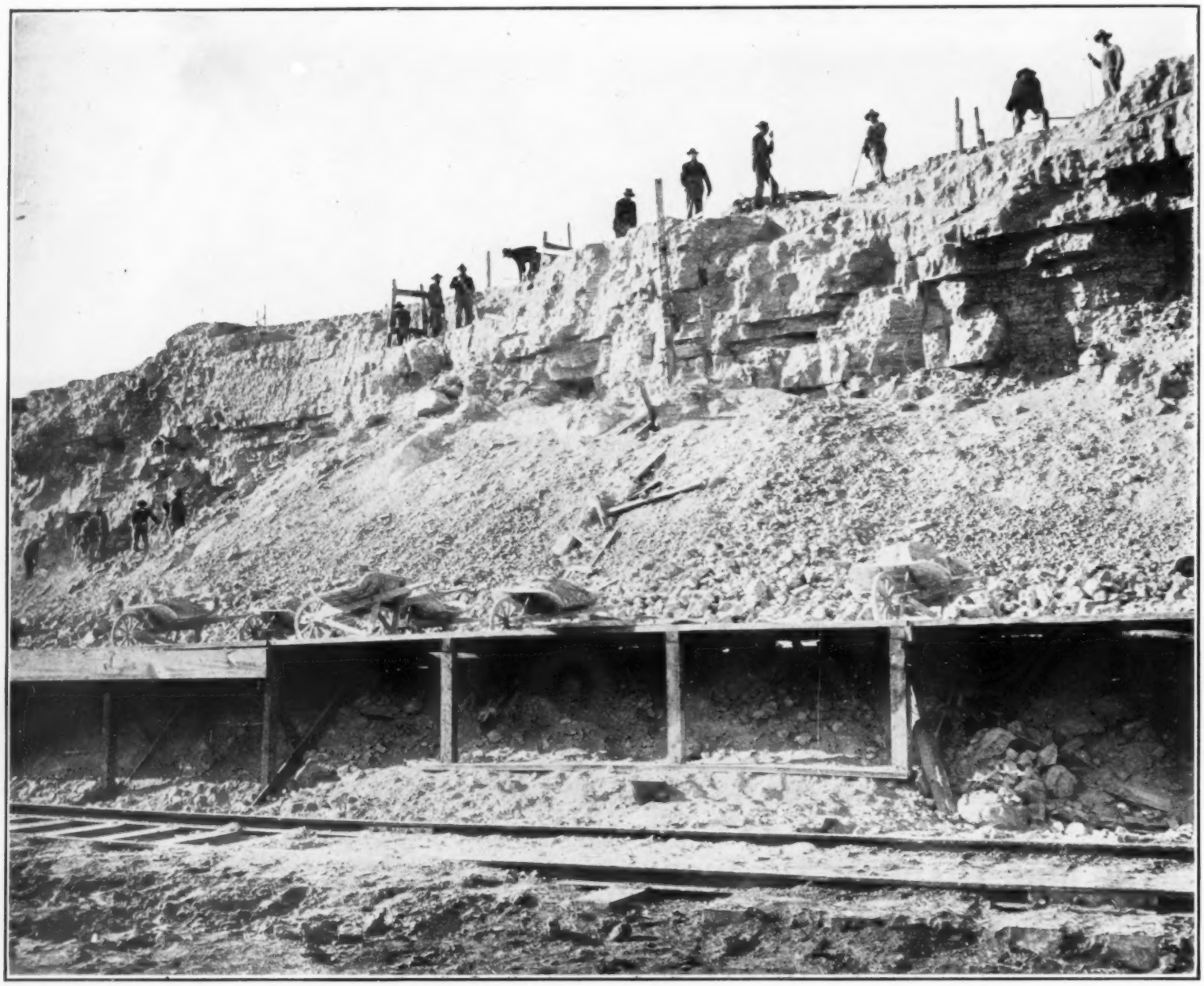
little or nothing to supply themselves with these commodities. Briefly, it may be said that some 220,000,000 people in the four great ironmaking countries supply not only their own wants, but the wants of all of the rest of the world, which may be taken at 1,300,000,000 more. Experience has shown that even partly-civilized nations, and nations with imperfect developments, all tend to increase their demand for iron and steel. But at the one end of the scale we have a consumption of 700 pounds per capita or more per year, while at the other end we have a per capita consumption of a few pounds only. It is, of course, much more likely that the lower will be leveled up to the higher average than that the higher will be leveled down to the lower. In other words, the exports of iron and steel by the principal ironmaking countries are certain to go on increasing year by year, with higher or lower fluctuations, according to the general conditions of trade at the time, but always rising in good times to a higher level than before.

As the case stands at present, however, the total exports of iron and steel by all countries concerned in the distribution of these commodities may be taken at about 10,000,000 tons a year, of which 4,500,000 tons may be assigned to Great Britain, 2,500,000 to Germany, nearly 1,000,000 tons to Belgium and the remainder to the United States, Sweden, France, Austria-Hungary, etc. Within the last two years this total has considerably increased, and there is at present reason to believe that in 1907 the joint exports of these countries will reach a considerably higher level than has been attained in any previous year. Indeed, for the first 10 months of 1907 British iron exports were 250,000 tons in excess of those of 1906, and fully 500,000 tons in excess of those of 1905, while the German iron exports for the first half of 1907 were considerably in excess of those of the first half of 1906, and those of the United States were relatively less in excess of those of the corresponding months of the previous year.

But the conditions of this contest of the future do not depend on raw materials alone, although that is the primary and fundamental factor. Much must also depend on such matters as the movements and attitude of labor, the rates of wages that employers are required to pay, the hours and the conditions of labor as affected and determined by trade-unionism and by legislation, the incidence of taxation both local and imperial or national as affected more especially by such enactments as those which have recently in Great Britain tended to hamper employers and restrain the freedom of industry in the trade disputes act, the workmen's compensation act and others, and those again which are still pending, designed to provide old-age pensions and to reduce the average hours of work in mines to eight from bank to bank. Again, there is the influence which is certain to be then exercised in industrial affairs by the socialistic movement more or less in all countries alike, but in some more than in others. The United States compares not unfavorably with European nations in most of these matters, and although labor is paid a higher rate of wages, it is not to be overlooked that longer hours are generally worked, and if the labor is not more efficient, it is at any rate more productive in the United States than in any other country, and there is much less disposition to hamper new processes and systems than in other countries in which labor-saving appliances and methods are not so generally welcomed nor so readily adopted. It has been a great advantage to the United States, in the competition for supremacy in all mechanical industries, that there is not, except in the rarest conditions, any objection to facilitate to the utmost the work of labor-saving machinery. It was this factor that gave the American iron trade the start it gained about a quarter of a century ago, and has retained up to the present time, but America will require to look to its laurels in the near future, because it is impossible to measure the vast strides that European countries have made, alike in the equipment and in the efficiency of the labor employed, in recent years.

The Movement of Iron Exports.

One of the remarkable features of this very remarkable year is the much more considerable increase of the exports of iron by Great Britain than that of any other country. In the first eight months of 1907 Great Britain exported 1,178,949 tons more of iron and steel than in the corresponding period of 1905, and the total British iron exports of 1907 are likely to be about 5,000,000 tons, which will exceed by about 1,000,000 tons the exports of any previous year except 1906. These figures present a striking contrast to those of the United States, where the iron exports of the first seven months of the year 1907 were 73,000 tons under those of the corresponding period of the previous year. Germany also has in the first half of 1907 reduced her exports by 90,495 tons compared to the first half of 1906. The recent iron exports of Great Britain have been at the rate of about 5,250,000 tons a year, while those of Germany have been at the rate of over 4,000,000 tons, and those of the United States at the rate of 1,442,000 tons (July only considered). These figures are not, however, applicable to iron exports to non-ironmaking countries only. The principal contribution to the increased exports of Great Britain in 1907 has been the American pig-iron hunger, which has been so great that the United States in the first eight months of the year took about 397,000 tons of British pig-iron, or nearly one-fourth of the British pig-iron exports to all countries, and this, too, despite the fact that the United States have in 1907 been producing pig-iron at home at the rate of about 27,000,000 tons a year. The United States and Germany together absorbed more than one-half of the total British pig-iron exports in



METHOD OF LOADING THE STORED SULPHUR.

1907, although themselves the two greatest iron-producing countries in the world. This is mainly the result of a phenomenal domestic consumption, and this applies more particularly to the United States, which has not increased her exports, as already stated, and whose exports at any time are but a bagatelle in relation to home requirements. There are many who fear that the near future may see an avalanche of American iron on European markets. Hitherto, however, American demands have gone far to keep British ironmasters in a condition of abnormal activity.

For a considerable number of years past Great Britain has been by far the largest exporter of pig-iron among the nations. The greatest quantity exported during the last 20 years is likely to be the trade of 1907; the next largest volume the 1,428,000 tons exported in 1900, and the smallest record the 764,000 tons exported in 1892. The United States have never been distinguished in this branch of the iron trade, and in the course of the last 20 years the largest quantity exported has been 287,000 tons in 1900, and the smallest 15,000 tons in 1891. Germany is a much larger importer than an exporter of pig-iron, and during late years she has imported as much as 727,000 tons (in 1900), and has exported as much as 418,000 tons (in 1903). Neither Russia, Sweden, Belgium, Spain nor Austria-Hungary have of late years reached an export of 100,000 tons in any one year.

Iron-Trade Profits.

The profits made in the iron trade of all countries during the past year must have been very considerable, although by no means equal per ton to what they were in the year 1873, when prices took a much higher range, but when Great Britain was almost the only ironmaking country that could take advantage of the opportunities then presented.

Prices were also higher in 1900 than they were in 1907. In most cases both the prices and profits were higher in the latter part of 1899 and the early part of 1900, but the boom of that date did not last so long as the present one has done, even if it ends with 1907.

It has always been the natural and inevitable result of high profits to stimulate largely the means of production. This result is now conspicuously apparent in all countries alike that have resources of iron output. In the United States the movement has gone farther than in any other country, and although I speak with some reserve of the situation there, having my information largely at second hand, I think there can be little doubt that the United States are nearly approaching, if they have not actually reached, the point at which an annual production of 30,000,000 tons of pig-iron can be guaranteed, if called for, and when any output much short of that figure will involve considerable losses to owners of unemployed plants, varying according to the extent of the unemployment. From this point of view it may be assumed that great efforts will be made to keep furnaces and mills as fully employed as possible, and this at a sacrifice of both prices and profits, if need be. It is not the loss of interest on expenditures and the depreciation of plant that alone conduces to this result, but employers are always deeply concerned to keep their men in full employment in order to prevent them from being scattered. A full staff of competent workmen is usually secured with much trouble, and once got, they are not willingly lost.

The profits realized in the iron and steel trades in 1907 will, on the whole, have greatly exceeded those of any previous year. I speak with some knowledge of the iron-trade profits of the United Kingdom, and by the profits of one ironmaking country we may pretty well judge of those of another. It has not been an uncommon thing to find balance-sheets published that show profits of 40 to 50 per cent. on the turnover. The balance-sheets of the Steel Corporation, open to all and sundry, show what has been the general range of profits in the United States, and the official reports of the leading manufacturing firms make similar disclosures of the business results of other ironmaking countries. The iron trade was never so well equipped as it is today to meet a period of storm and stress, speaking of it generally. But in very many cases the profits that should have been applied to the building up of adequate reserves have been used in rebuilding old and adding new plants which may not be utilized for years to come. Less has been done in Great Britain and France in this direction than has been done in the United States and Germany, and it need excite no surprise if in the two last-named countries the pinch of the setback will be much more severely felt than in the other two, or indeed than in any other countries.

The Present Aspect of Demand.

Ten years ago he would have been a bold man who prophesied that the last three years could have generated such an increase of iron consumption as has actually taken place. He would be not less bold that would predict that the volume of consumption during the last-named period is likely to be maintained. I do not myself believe that it will be. I even believe that there may be a serious and not improbably a phenomenal fall all along the line. The past presents us with the assurance that it must be so in the future. The financial crisis in the United States, the depreciation in the value of most securities, the exceeding tightness of money, the general apprehension that we must expect to see, changed conditions of trade, the railway depression in nearly all countries and the tightening of the purse-strings of railway corporations generally, the collapse in shipping business and the almost entire stoppage of shipbuilding orders, the unprecedented depression in the building trade of a dozen different countries and many cognate and collateral facts all indicate that a period of dullness at least is probable, and that the boom has been pretty well weakened.

The Struggle for Business.

It needs no seer to be able to acquaint us that if the world's business is reduced very materially, while the resources of production have been rapidly and largely increasing, there must be a greater struggle than hitherto for such business as becomes available. This is the coming event that most vividly casts its shadow before, and for which most ironmaking countries are now preparing.

When the struggle comes a l'outrance, the question that is likely to exercise most influence on the command of foreign markets is that of the extent to which prices can be lowered in order to tempt business. There is altogether, as I have shown, about 10,000,000 tons of iron and steel to be shipped to neutral and dependent markets. Of that large volume, the United Kingdom now commands nearly one-half, worth, at present prices, fully £40,000,000. The British iron and steel imports for the first eight months of 1907 were about £32,000,000, and the value of the British iron and steel exports for the same period was not less than £64,000,000, including machinery and ships sold abroad, cutlery, hardware and scrap. The markets to be supplied are very numerous, and include a number of countries that are now doing what they can to become self-supporting, so that they will not always remain equally important, but one goeth and another cometh, and there are many yet to be developed.

Pig-Iron Capacity.

The United States has unquestionably done much more during the last few years to increase the capacity of the furnaces producing pig-iron than any other country, so that it has now a notable increase of opportunity to seize a great advance in demand, but it has, at the same time, a prospect of being more hurt by the occurrence of a serious slump. The number of new blast furnaces blown in during the last three years is not less than 28, representing a fresh capacity of about 4,000,000 tons, and bringing up the estimated annual productive capacity at the end of June last to 28,000,000 tons in round figures. The annual capacity of the blast furnaces of Great Britain is not more than 11,000,000 tons, while that of the blast furnaces of the Fatherland is approximately 13,000,000 to 14,000,000 tons, say, 13,500,000. For the three countries, therefore, the total capacity of pig-iron output is approximately 52,500,000 tons.

Policy of Development.

Both in the United States and in Europe it has been a much-debated point whether it has been good policy to develop the ironmaking resources of the former to the extent that has taken place during recent years. This is a problem with respect to which it is obvious that much may be said on both sides—in approval, because the existence of those plants has alone enabled their owners within the last two years to reap vast profits, and in disapproval, because in a period of profound depression which is not unlikely to come again before long the losses must chiefly fall upon those who have large properties to maintain whether idle or employed, and who must make the greatest sacrifices in order to secure contracts. This consideration lies at the root of the future of the United States Steel Corporation. A large part of the great profits made by that organization during the last few years has been invested in new plants. Those plants were to a large extent called for by the most modern conditions of trade. They are likely, in the long run, to place the Steel Corporation in a better position than they would otherwise have held, not only to compete against independent firms possessed of less up-to-date plants in the United States, but also to strengthen the competitive resources of the corporation as against outside rivals.

At the same time, they would greatly err who might assume that the United States was in the same relative competitive situation today as they occupied ten, or even five, years ago. In the interval European countries have made great advances in respect to the character of their equipment and the efficiency of their organizations generally. Europe has in not a few cases bettered the instruction conveyed years ago from American sources. This remark applies more especially to Germany and Great Britain, but it is also true of such comparatively unimportant countries as Sweden, Austria, Italy and Spain. American engineers have been employed in a number of cases to reconstruct European plants, and have taught European ironmasters how to attain the most efficient American conditions, adapted, mutatis mutandis, to special local needs. Hence the annual output of iron per furnace has been rapidly raised in most European countries during recent years. In Great Britain, which may be taken as a typical case, the average annual utput of pig-iron per furnace has nearly doubled within a few years. Germany has, if possible, made even greater progress. And as with the furnaces, so also with the labor employed. The average annual make of pig-iron per workman has in the last few years greatly increased, alike at blast furnaces and at rolling mills, and taking the difference of other conditions into account, is not likely to be much behind the average of the United States. The moral is obvious. American producers are not so likely to "clear the board" of the future as they were when pig-iron was being made in Alabama and sold at 25s. per ton, against English pig that cost considerable more to produce.

Estimation of Opponents.

There is, I think, a disposition on the part of our American friends to hold Great Britain rather too cheap. It is always a mistake to hold an adversary lightly. In some leading American journals I have again and again seen it argued that British trade was going to the wall, and that our industrial career was practically closed, so far, at least, as iron and steel are concerned. Mr. Carnegie has time and again set forth this view. But what are the facts of today? In the first six months of 1907 Britain exported domestic produce of the value of over £206,000,000, which is £62,000,000 more than the value of her domestic exports in the first six months of boom year 1900, and these increased exports are not, as might be supposed, mainly to British colonies, but to foreign countries, where in all but one or two cases there have been high-tariff walls to overcome. Indeed, it is interesting to note that Britain's largest exports have for years past been sent to the United States and Germany—two countries that have the highest tariffs, next after India, which takes the premier position.

Per Capita Increase of Demand.

A not uncommon measure of the probable increase of demand for iron and steel in the future is its per capita growth in the past. This measure, however, would be likely to lead us to rather confusing results, and is by no means to be implicitly relied on. I have in a former communication referred to the per capita increase in the German iron trade. In 1876 the annual consumption of the Fatherland, so measured, was about 84 pounds, and it rose more or less intermittently until in 1900 it was 263 pounds, but from this point there was a serious depression, and that figure has not again been recovered, and the average of 1902 was no more than 152 pounds. The production of pig-iron per capita has not been so irregular, and has always in Germany been considerably ahead of the average consumption, as the exports to other countries have grown larger from year to year. But in no single year has the difference been equal to the figures recorded for the United States for the year 1906, when the iron production fell off, as compared with that of the previous year, by close on 5,000,000 tons, whereas the greatest yearly difference that has occurred in one year by decrease in any other country has been 2,300,000 tons. These figures are only quoted to show the extremes of fluctuation that have happened in the past, and the consequent proved possibilities of the future. We know that a drop of 5,000,000 tons in a single year's demand is not beyond our ken in the past. The general anticipation as to the future may not, of course, be reached. There are many good prophets who do not think we are likely to have a slump, although they own to the belief in a temporary lull. Why should there be anything more? they ask. There is no real scarcity of resources. A money famine due to hoarding and panic is not the same thing as a depression entailed by heavy overexpenditure and general depreciation of values. Anyone who wants to get a clue to the possible increase of permanent demand for iron and steel cannot do better than carefully

examine the statistics of the per capita growth of consumption of iron in the chief countries of the world over a certain number of years. The incidence of growth tends to increase from year to year, and of recent years the growth has been quite phenomenal. It would, perhaps, be unreasonable to expect that this rapid growth will be continuously maintained, but not to anticipate a material advance between one five-yearly or ten-yearly period and another. In this, as in other directions of growth, there are also slow-moving and quick-moving nations. The most rapid increase is found in the United States and the United Kingdom, which until quite lately ran a week-to-week race. The slowest-moving nations are Russia, Spain and Austria-Hungary. Outside of Europe there are, of course, much slower nations still, which, however, are accelerating their movements, and in a few years more may make very sensible advance. Among these China stands prominent, with a population of approximately 400,000,000 and a recently-constructed railway system that now exceeds 4000 miles, which is no doubt destined to make much more rapid advances in the near future.

The Iron-Ore Problem.

The aspect of the ore problem as presented at this time a year ago has not varied greatly in its general features, although there can be no doubt that the values of large deposits of workable iron ores is increasing from year to year, and will continue to do so, despite the possibilities of a more or less serious reaction in the near future. For this reason it behooves all who own iron-ore deposits in any part of the United States to inquire diligently into current and prospective values before making any arrangements for a sale. In your country this is probably quite well understood by now. The deal of the Steel Corporation over the so-called Hill ore properties made that sufficiently clear, the agreement in that case providing for an annual increase to the $1.65 agreed upon as the base price. In Germany and in France the same tendencies are observable in respect to the deposits of the Meurttre-et-Moselle and Alsace-Lorraine, and deposits that were lightly regarded as to the value only a few years ago in Norway, Sweden, the South of Spain and elsewhere are now being treasured as most valuable possessions and have rehabilitated unprosperous firms. It is, however, obvious that if we are to have a period of stagnant trade there will at least be a respite for those who have been worrying themselves about the supplies of the near future. All bargains made for supplies on the prices of the last three years must, of course, involve higher prices for iron and steel, and it is probable that we shall not again see a return in any case to the prices that prevailed in the period 1892-96. No typical interest or corporation could afford to produce either iron or steel at those prices. So, the better organization of most manufacturers, whether trusts or otherwise, must help them to hold and control the market as they have not done before. The available known supplies of rich ores are becoming rapidly depleted. The output of iron ore needed to maintain the rate of pig-iron throughout the world in 1907 is not less than 125,000,000 tons. The best reserves in Europe are not of large extent. The best and largest American supplies are not only rapidly depleted, but are tending in most cases to a lower grade and a greater working cost. The splendid position held by American ironmasters when the Mesabi range was yet a virgin field is rapidly being assailed and threatened under the influence of an annual demand that now exceeds 43,000,000 tons of the Lake Superior ranges alone. It remains to be proved that equally rich and satisfactory supplies can be secured in other regions, but it is not improbable that much good ore may be relied on from the new deposits now being developed.

The Recent Financial Crisis.

So far as can be judged, the financial crisis in the United States during the last few weeks has not seriously reacted on the business interests of Great Britain. It has in a number of cases interfered with business relations on the other side of the Atlantic, but the only material general influence has been the creation of a temporary scarcity of money, due to the large shipments of gold on American account and the consequent raising of the bank rate for a short time to the quite abnormal figure of 7 per cent. The export of large shipments of pig-iron to the American market had become a thing of the past before the crisis had occurred, and the one was not in any degree a consequence of the other. The exodus of labor from American ports may, however, affect the British labor market, and has in a few cases done so. The conditions here had not been invariably satisfactory for some time before. In the shipbuilding centers work has been getting scarce for sometime, and in Sunderland it is on record that at present more than 4000 workmen, largely connected with the industry, are without employment, although in the earlier part of the year the shipbuilding yards were generally fully employed. In this industry, it may be remarked, Great Britain still stands facile princeps, having produced on an average of the last three years about 1,750,000 tons a year of new tonnage, and consuming in 50 days an average of 1,500,000 tons of iron and steel. Ship plates are for that reason the greatest individual product, after pig-iron, of the British iron trade, while almost the least important of that of the United States. So far as the effects of the crisis on the United States are concerned, conflicting views are held among European governments. The general view is, I believe, that the financial crisis which is at present dominating the situation is not likely to long interfere with the prosperity of the country and the course of the trade. An important clue to the probabilities of the future is the fact that in the past the trade of the United States has practically doubled every 10 years. Of course, as the commerce of the country assumes larger dimensions it will be less likely that this rate of advance can be maintained, but it is not improbable that it will relatively increase, and all the more so that it has been estimated that the world's output of gold may next year reach £100,000,000, or much larger dimensions than hitherto. The wealth of all the commercial nations has of late years assumed colossal dimensions.

Pig-Iron Output of 1907.

I do not think the output of pig-iron in 1907 is likely to much exceed that of the previous year, when it was about 60,000,000 tons for the world as a whole. The recent rate of advance has been colossal. Since 1895 there has been an increase of 31,000,000 tons in the world's iron output, whereas between 1850 and 1900 the total advance in production was only 35,700,000 tons. In most countries the last two months have witnessed a slackening down, and by the end of the year it is not unlikely that the resources of iron production will be still less fully employed. It is hardly likely that either the United States or Germany will be able to dump surplus output on British markets as they did in 1903, 1904 and 1905, inasmuch as the British works are now much better prepared to face an adverse situation in the world's markets than they were at that time, due to their better equipment and organization.

Last Words.

It would easily be possible to carry this important and inviting subject much farther, but I fear to have already exceeded the reasonable hospitality of your columns. Let me add that in Europe, as in the United States, there are apprehensions that the financial crisis, which has already caused so much suffering and misery, has not yet run its course, and that the survey of the money markets of the world is not at all satisfactory. Leading financial authorities have been arguing that there has been an abnormal expansion of trade and industry in most countries, and that industry has grown faster than capital. But the special business of industry in most countries is to create as well as to absorb capital, and the history of the iron industry of the United States makes it clear that it effectually does so. In London there has recently been a peremptory call for a halt in new commercial enterprises. Until confidence has been restored this would probably not be a bad thing.

London, England, November 30, 1907.

The Tour of the European Spinners in the South.*

By M. V. Richards,
Land and Industrial Agent Southern Railway.

[Written for the Manufacturers' Record.]

A review of the features of the visit of the 115 European spinners and the results of their trip through a good portion of the South in October is possible at this time. That over 100 manufacturers in any line, from seven or eight different nations, should travel across the Atlantic and in a party make a long visit to our country, studying conditions here, making personal investigation into cotton-growing and handling, meeting and conferring with so many of our growers and manufacturers and dealers, is really remarkable. Such a visit must have results of importance. Naturally, the section most vitally interested is the cotton-growing portion of the country. It will take a long time to fully develop the results of the Atlanta conference, where all interests were thrown together, and the trip through the South's cotton-growing and cotton-manufacturing belts.

These Europeans were representatives. They included some of the very big men of the cotton interests of the various countries from which they hailed; very many of the influential leaders in the International Association of Cotton Spinners, representing 90,000,000, or nearly three-quarters of all the world's spindles; men with quick, active minds, of experience and evidently able to take a world comprehensive view of their industry and all that affects it. With these leaders were a great many of the brightest young men in the spinning industry of Europe, the men who will dominate in the years to come, and whose study of American conditions perhaps means even more to us than does that of the present leaders. These gentlemen all came to our shores with a large experience in the cotton trade, both domestic and export, to all parts of the globe, and in the use of American, Egyptian and Indian cotton. They showed an entire familiarity with the statistics of cotton growth and manufacture in this country, seemed to know much about the methods in vogue on the cotton plantation, the methods of handling cotton, and many had decided ideas as to the progress of our cotton-spinning industry as well as to improvements which they desired in the ginning and baling. They came, therefore, with a good preparation for a study of, at first hand, conditions in the South and for discussing with our people the things which ultimately concern their business. It is not too much to say that even a few days spent by such men as these on cotton plantations and at cotton markets and in talking with growers, warehousemen and dealers must have a very great influence both on the visitors and the Americans. This influence may be tardy in showing itself; it may have to be emphasized by other visits, correspondence and discussion before it is felt to any appreciable degree, but it will come to be recognized. I believe the American cotton-grower, dealer and manufacturer will be greatly benefited by the visit of these gentlemen, and especially by their tour through the cotton-growing States. I also believe that the European manufacturers have returned to their homes with many new ideas of our country, of the cotton-growing conditions and possibilities of the United States, of the resources of our country, and that the benefit must therefore be mutual.

Some of the points which come to me at this time which may be worthy of reference are:

1. Very many of us have gained from our intercourse with these visitors a new appreciation of the magnitude and importance of the cotton-manufacturing industry in Great Britain and on the Continent, and of its close relationship with the development of the production of our American cotton plantations. The European manufacturer has developed his industries by close study of conditions and rigid economies in production. His work in these lines ought to teach both our manufacturers and growers. We have learned from these gentlemen their very great concern for a cheap as well as an adequate supply of raw cotton, and something of their efforts to secure this supply. These gentlemen came with very pronounced ideas as to economies which might be effected in our production and handling of cotton, and which would help them to a cheaper supply and a better one. One way in which they would economize in the cost of production is in increasing the yield. That is not a new idea to our planters, at least to the progressive ones, nor to our people of the South generally. It has been preached for years past, but has not the visit of these gentlemen given it new emphasis? It was made very plain by these manufacturers that the market for cotton goods is constantly widening and the market steadily growing, and the cotton productions of the world must increase with this growing demand. What this means to the Southern States is evident, whether the demand is supplied by European, Asiatic, New England or Southern mills, and it certainly establishes a basis for that closer touch desired between the producers and consumers of the raw product.

2. The manufacturers gained new, or at least strengthened old, ideas as to the possibilities of a steady increase in the amount of cotton grown in the Southern States to meet all demands likely to be made by consumers for a great many years to come. It may be that a good many of them did not previously fully understand that the agricultural territory of these States was not only not fully in use, but was still largely unde-

*The Southern Railway, with its special-train tour of the South and some other portions of the country, carrying the very large representations of European cotton spinners who visited the United States in October, naturally became closely identified with that visit. Indeed, to its land and industrial department, which arranged the tour, was very largely due the visit at that particular time.

veloped. Their visit to the different States has probably given them a better knowledge on this subject. They have learned that wide areas of good agricultural land remain to be improved for cotton crops, as the demand justifies its use for them, and that our people are rapidly coming to understand that by the use of improved methods of cultivation the yield from the present area and the doubling or quadrupling of the American cotton crop is only a question of the demand from consumers and a problem of added labor. At Greenville, Miss., it was pointed out to the visitors that the area of the great Delta region, on the two sides of the Mississippi, when brought into good cultivation could produce 18,000,000 bales of cotton. That is only a small part of the cotton-growing regions, though the most fertile.

3. The tour of the South gave the visitors a chance to see a great deal of it, to visit many cities and towns and to gather a great deal of information about the resources and opportunities of the territory. This fact alone made the visit of such a body of men of great importance to the South, if only from the advertising received. It was a magnificent advertisement. Much, very much, was shown the visitors, mostly, of course, of undeveloped resources and future possibilities. The information carried home by the gentlemen, and which will be remembered, will go to a great many people and give to widely-separated communities ideas and facts about various sections of the country. Coupled with all the other impressions which the gentlemen have taken home with them is the memory of the warm-hearted, ever-present hospitality shown them, and theirs will be an ever-friendly feeling for people and things in the South. Through them we have come to know better European people, ideas and characteristics, and all this will have its influence in cementing closer ties between their lands and ours.

Many of the gentlemen who made the trip took occasion to study carefully different phases of the South's resources and developments. The Whitney power development in North Carolina attracted several of the party, who made a special trip to look it over. Others took side trips to look over some localities not included in the itinerary. There was always an interest shown in the reports of power developments, in the cheap fuel supplies, etc. There was also special interest taken in the cotton plantations, the methods of cultivation and the labor supply, and many were the expressions of belief in the opportunities offered for a great and splendid development of both agriculture and manufacturing in the South. Some of the visitors made inquiries about the country as a field for Europeans, and expressed the idea that they saw many opportunities for people of their own countries to settle.

The South is undoubtedly the best section of the country for Europeans, but it has always been a hard thing to make them see this. There have been erroneous impressions in the various European countries about the South, its soil, its climate, its healthfulness, its customs and its people. This tour will do much to correct that impression, much to give people on the other side a true idea of what the Southern country is, what it has accomplished and what it holds out for enterprise, thrift and capital. Our visitors saw our growing cities, they learned much of our great and varied resources, heard of the success of our manufacturing interests, viewed vast stretches of our farming lands, investigated our shipping facilities, and, best of all, became acquainted with our people. They returned home pleased and satisfied with their trip, and our country will be a great gainer from their visit. In England and Scotland, Belgium, France, Portugal, Spain, Austria and Italy kind and assuring reports will be circulated about the United States, and especially about the South.

Secretary Wilson on the Agricultural Outlook.

[Written for the Manufacturers' Record.]

"My studies are along the line of agriculture alone," said Secretary Wilson to a representative of the MANUFACTURERS' RECORD, "and I can speak of future possibilities for prosperity in the United States only as they are related to the creation of wealth from the soil. But in that relation the possibilities are almost beyond computation and quite beyond our present comprehension.

"In the first place, I doubt whether a general crop failure can occur again, bold as the statement may sound, for if the farmers of the United States in such an erratic season as that of 1907, and handicapped by lack of help in all parts of the country, were able to pile up a total of $7,412,000,000 in crop values, it would seem that they hardly need fear failure in normal seasons. Crops may fail locally, but the agricultural prosperity of the country as a whole is assured. Just as the farmer who diversifies his crops may be a loser here or there, yet, on the whole, make money, so the agriculture of the nation may fail in places and still produce a grand aggregate of values that will make the country the richest on earth.

"The fundamental consideration is the soil. It is our duty to conserve and improve that soil, and influences are actively at work which have those ends in view. The relation between the physical texture of the soil and the retention of moisture is being investigated more closely than ever before, and the age-old question of drainage goes with it. Soil fertility is being studied from new angles and some new theories of a radical nature are being worked out. The gathering of nitrogen from the air by means of leguminous plants, such as the cowpea, the clovers, the alfalfas, etc., is being more and more widely practiced. Measures are being taken to check erosion of the soil, which annually takes from the farms and uncultivated lands of the country at least 1,000,000,000 tons of sediment, choking the rivers and reducing the fertility of the land. If the States and the nation co-operate with individuals in doing what can be done to check this gnawing away of the soil, much of this deplorable waste can be prevented and our greatest national asset preserved. The future will undoubtedly see improvement in this regard. These operations upon the soil, as they become better known and more widely practiced, cannot help but have a far-reaching, beneficial effect upon the progress of agriculture, and so upon the prosperity of the nation.

"The enormous aggregate of wealth produced from the soil of the United States is in reality based upon very low average yields per acre for many of our staple crops. For example, the corn crop of this year, estimated to be worth at least $1,350,000,000, is founded upon an average yield per acre at which the best farmers smile. Means of raising this average far above its present level are at hand and rapidly coming into practice. In my annual report for 1906 I said that the corn crop per acre can be increased by one-half within 25 years and then the limit would not have been reached. This, too, without any magic. The application of principles known and proven will achieve this result. The Department of Agriculture has shown, for example, that the farmer can increase his yield of corn 10 to 15 per cent. by simply planting seed corn of perfect vitality, and it has pointed out easy methods of testing vitality which any intelligent person can follow. The farmer should be protected from seed adulteration, and active measures are being taken to check this evil practice—measures in which, by the way, the rank and file of American seedsmen are anxious to co-operate. The present yield of cotton is about two-fifths of a bale per acre—perhaps a little more or less at times. This could be doubled or trebled, and certainly will be as time goes on and the world's demand for our cotton grows. Nothing more is needed than to follow plain and fully demonstrated principles of farm management, such, for instance, as the planting of the heavy instead of the light cottonseed, a practice which has been found to increase the yield from 10 to 15 per cent. A very simple apparatus for separating the light seed from the heavy has been devised by Department experts, patented, and the patent presented to the American people. Improvement in the quality of cotton is being effected by careful selection and breeding, and the same principles of improvement are being applied to corn, to sugar beets and many other crops. These measures as they become better known and more generally applied cannot fail both to increase the yield and improve the quality of staple crops, and thus add great values to agricultural production.

"The introduction from foreign countries of crops adapted to some of our varied conditions of climate and soil will in the future, as it has in the immediate past, bring prosperity to great regions of our country which have been regarded as of doubtful value for agriculture. No more notable instance of this can be mentioned than the bringing of Durum wheat from Russia and Africa during 1899 to 1902. The Department spent in the beginning some $10,000 in introducing this wheat. It grows in regions where the rainfall is light, and the crop this year, less than a decade after the first introduction of the seed, is worth over $30,000,000. Drought-resisting alfalfas from Siberia will greatly extend the use of this invaluable forage plant, and through these two crops alone profitable agriculture is made possible over wide reaches of the country which were formerly regarded as being at best a range for cattle, where it required 20 acres to feed a steer.

"The extraordinary interest that is now taken in alfalfa is justified by the extraordinary value of this great wealth-producing plant. This year the value of the alfalfa crop for hay alone is supposed to be $100,000,000. If the extensive experiments now in progress are as successful as they promise to be, the area on which this crop may be grown will be greatly extended. Its cultivation is moving eastward, and the plant is making its way even in Indiana and Illinois. It has wonderful values. With a yield per acre twice that of hay, and more nutritious than hay, it has no superior as a forage crop, a milk producer and an egg producer. But, from the point of view of national prosperity, this is not its only nor perhaps even its chief merit. It is one of that wonderful group of leguminous plants that gather nitrogen from the air and impart it to the soil. The introduction of such plants throughout the country will be a factor of great importance in our future prosperity, saving our good soils from deterioration and helping powerfully to renovate those that are run down. From the extension of the cultivation of this one group of plants will come added values of hundreds of millions of dollars annually to our agricultural wealth.

"In so far as we can raise at home the products which we now import from foreign countries we shall foster industry and give employment to our own people and our own capital. This is a thought I have had constantly in mind since I came to the head of this Department, and the sugar-beet industry is a good illustration of what can be done along this line. We are a nation of sugar-eaters; our per capita consumption is now the largest in the world. The greater part is imported, but an increasing proportion is domestic sugar from the beet. The history of the industry is instructive. Thirty years ago about 560 short tons of beet sugar were produced annually in the United States, while in this year of 1907 the total production will reach 500,000 short tons. In nine years the value of the production has increased 543 per cent., land is now more than $50,000,000. Very rarely has a great industry developed from nothing to such magnitude in less than a generation of men. The raising of sugar beets, the manufacture of sugar therefrom and the utilization of the pulp in feeding cattle are certain to become great influences in our future national prosperity.

"Irrigation and drainage, the one putting water where it is needed, the other removing it from where it is superfluous, will add great wealth to the country as time passes. Five million acres of land, provided with water, will be ready for settlement in 1908. The settlers on this land, many of whom will have no knowledge of irrigation farming, may make mistakes at first, but their ultimate success is beyond doubt. If all of this new area came under cultivation at once the crops, plus those now produced on irrigated land, would be worth at present prices $250,000,000. It is believed that even in the East irrigation as a kind of crop insurance will be valuable, and better knowledge of its possibilities will no doubt lead to an extension of the practice throughout some regions where the rainfall is sufficient under usual conditions.

"Drainage of large areas of swamp land, carried out by community effort, is certain to result in large additions to the available agricultural land. Several very large projects of this kind are under way or in consideration, notably the survey of the Florida Everglades, a tract of swamp land covering 5000 square miles. It is believed that the survey will prove the practicability of draining and rendering cultivable a large part of this land, now too wet for agriculture and practically worthless. The Kankakee valley project in Indiana involves the straightening of the channel of the Kankakee river and the removal of nearly 10,000,000 cubic yards of material at a cost of about $1,000,000. Six counties in Indiana and one in Illinois are interested, and 500,000 acres of land will be benefited. Similar land in Indiana has risen in value after drainage from $5 to $100 per acre.

"Irrigation and drainage have, of course, been practiced for ages, but the reclamation of great areas of desert land by the application of water and the drainage of great swamps by community or State effort are comparatively recent developments in the United States, and cannot but have far-reaching effects on our agricultural production.

"One of the foundation stones of our nation is our system of public education. From my viewpoint, however, the public-school system in country neighborhoods has had one serious defect—it has tended to educate the farm boy and girl away from rather than toward the farm. It has failed to train the young farmer in the elements of the sciences which govern his life work, and this was largely because agriculture was a science without teachers. But since the establishment of the agricultural colleges this condition has been changing. The splendid work of these institutions is becoming better known and appreciated, and through their graduates education in agriculture is by degrees filtering down through the educational system into the common schools. In 41 of the States some attention is now paid to the teaching of agriculture

in the public schools, and 64 State normal schools now conduct regular courses in agriculture. This educational leaven will in time work its way into the country schools everywhere, and the time is not distant. It cannot fail to have a profound influence on agricultural practice and farm life generally, and while it is but a single factor in national prosperity, it is, in my opinion, a factor of prime importance. I believe that it will do more than any other influence to keep the farm boy on the farm by showing him the interest and profit that are bound up in the practice of improved, scientific farming.

"In my last annual report I have attempted to set forth the achievements of American agriculture up to the present time. They are expressed in figures which are beyond our powers of comprehension, but the increasing momentum with which our national agriculture will move as the years go by must inevitably produce a sum total of wealth such as the world has never seen gathered within the boundaries of a single country. Considering the results in the creation of wealth attained by our present practice in agriculture, and reviewing the influences that are at work to improve that practice, it is impossible to take any view of our future but a hopeful and optimistic one. We have made a good beginning in producing wealth from the soil, though we have, perhaps, been somewhat wasteful and careless of posterity in our methods, but today we are fully awake to the various dangers of soil exhaustion, soil erosion, forest destruction and other forms of faulty practice, and know the remedies for these evils. When, with a wider diffusion of existing knowledge, the discovery of new truths and closer cultivation of our lands, we begin to approximate more nearly our real productive capacity, we shall attain a degree of material wealth the like of which has never been seen before. Agriculture is the basis of our national prosperity. It feeds and clothes the people, and, including forest products, supplies 70 per cent. of our exports. It is and will remain successful and progressive, and upon a prosperity so founded a financial crisis of the particular kind we have just passed through can have no more lasting effect than spring rain upon granite."

Millions of Money in Draining Swamp Lands.

By Edward Wisner, New Orleans.

[Written for the Manufacturers' Record.]

The acquisition of the United States of a territory capable of supporting the present population of Louisiana would be an event of historic importance. Louisiana today embraces within its boundaries an area which is, in its present condition, as useless to its people as a corresponding area on the high seas. For the most part it pastures no cattle or other live-stock, and contributes nothing to the welfare of mankind. It is not only of no utility, but it is a positive nuisance.

Yet this now worthless area, something over 7,000,000 acres, is the greatest body of fertility in the world except probably in the Amazon flood plain. Its wealth-producing capacity is so great that the figures I give look like extravaganza to one who has not studied the facts. These 7,000,000 acres of land can all be drained, and, except for the area necessary for roads and canals, can all be made productive. For the purposes of comparison it will be assumed that the new lands are the equal of those already in cultivation, although that they are greatly superior will not be denied.

The cultivated portion of the alluvial district south of Red river is today supporting the densest agricultural population in the United States—a population of 330 per square mile of cultivated land, omitting entirely the urban population of New Orleans. And this support is generous. No other equal area in the United States planted in staple crops produces one year with another so much wealth, and no rural community gives greater evidence of accumulated wealth and luxury.

Based upon what the alluvial lands are now doing, the undrained lands of Louisiana—lands today wholly unoccupied—are capable of supporting over 3,500,000, a population exceeding any one of 40 States of the American Union, and then not counting the attendant city population. Cultivated, as the sugar district of Louisiana now is, and the annual wealth production would approach the present value of the cotton crop of the United States and exceed by millions the value of our entire wheat crop. These figures seem incredible, but they are according to results obtained in alluvial Southern Louisiana at the present time. Lest they seem too wild, let them be compared with two other similar areas in the Old World, namely, Holland and Egypt.

Holland, on an alluvial area (2,750,000 acres) considerably less than one-half of Louisiana's undrained area, and with a fertility not up to the Louisiana standard, supports bout 5,000,000 people, and up to the highest standard of Europe. Holland is almost a synonym for wealth. Egypt, with a cultivated alluvial district (5,340,000 acres) considerably less than the one under discussion, supports 10,000,000 people, not up to the European or American standard, but since the population supported per square mile is about the same as in Holland, the lower standard of living is doubtless due to the character of the people. On 1,500,000 acres of land Egypt produces fully one-seventh as much cotton value as does the whole United States; that is to say, one acre of cotton in Egypt is worth approximately four acres in this country, and we are buying a continually increasing proportion of Egyptian cotton every year. Egyptian is a more valuable cotton than our standard cotton, but it is worth less than our Sea Island cotton. It happens that Sea Island cotton grows to perfection on the seacoast lands of Louisiana, and we have here enough first-class Sea Island cotton lands, when once drained, to duplicate in pounds and to exceed in value all of the long-staple cotton produced in the world, Egyptian included. It will thus be seen that the estimate of what can be done on the undrained lands of Louisiana, which estimate is made by the present Louisiana standard, is only a little over one-half of what may be expected when fully utilized according to the Old World standard.

Considerably more than one-half of the undrained area of Louisiana consists of the wet seacoast prairies and marshes. Throughout the country generally it is assumed that this area is the abiding-place of malaria, but such is not the case. Adjacent to these marshes live the dense population of the sugar belt. Malaria is almost unknown. During the last few years a considerable number of Northern people have been engaged in reclamation work in the parishes of Terrebonne, Lafourche, Jefferson and St. Bernard, and there has been only one case of malarial fever or chills, and that case a mild one. There is no more malaria along the Gulf coast of Louisiana today in its undrained condition than there is in the already drained corn belt of Illinois. This statement is likely to be doubted, but it is easily proved. This question of health is perhaps the most important of all, and what is true of the seacoast lands of Louisiana is also generally true of the entire seacoast savannahs from Chesapeake bay to the Rio Grande. This statement does not apply to the wooded swamps except where near to the coast.

But will it pay? This is the question which must be answered in the affirmative if the work is to be done. No matter how desirable it might be from any other standpoint, no work of this magnitude is possible unless it will show a profit in dollars and cents. Any estimate of cost in money is very difficult, because of the rapid rise in the prices of material and labor, but at present prices it costs from $10 to 20 per acre when the difficulties are not unusual. As to the wet prairies, it may be said that it will cost less than one-half in human labor per acre that the alluvial lands already in cultivation have cost. The cypress swamps will cost more, but the cost of preparing for cultivation the entire 7,000,000 acres of undrained lands in Louisiana will not equal the cost of putting into cultivation an equal area of wooded lands anywhere in the United States, and when we consider that an acre of this land reclaimed will produce at least four times as much annual value as the average farm land of the United States, the question of profit is answered. And as to the wet prairies, it can be done quickly, and that in this age of quick results is a matter of first importance.

This reclamation work is already far enough along to prove its practicability and profit. At first it was assailed by doubt and pessimism, but today its merit is universally recognized. Scores of drainage projects are now actively under way, and thousands of acres have already been brought under cultivation with most satisfactory results. The production of these new lands far exceeds that of the older cultivated lands of this famously productive delta, and except where reclaimed by companies for the purpose of sale, they are rarely offered at any price. Here the drainage movement is getting momentum, and it will not stop until South Louisiana has become the richest agricultural community of its size in the world.

Shall the United States Government drain the swamps and marshes for us? This question was squarely put to the State Drainage Convention held in New Orleans in October last. That body of representative men declared almost unanimously in the negative. Personally, I believe that every acre of the wet land should bear the cost of its reclamation: that the business of land reclamation is sufficiently profitable to render public gratuity unnecessary, and further, that there is already a too prevalent disposition to run whining to Washington for help in matters of local concern, and that Government aid is unnecessary and demoralizing to a proper spirit of independence and self-reliance. Not only in Louisiana is the drainage sentiment growing, but everywhere in the country, and particularly in the South, where there are large bodies of wet lands, reclamation work is either in progress or contemplation, all of which proves that the work is opportune and that the economic necessity is upon us. Florida possesses the greatest acreage of wet lands of any State in the Union, and there the drainage is the live political issue of the times. The State is undertaking the drainage of the Everglades, and at the same time litigating the title to the lands. No State needs drainage so much as Florida. Its uplands poor and thin, the drainage of its swamps and savannahs, which are found in all parts of the State, will produce a transformation and make it one of the richest agricultural States.

North Carolina, South Carolina, Georgia and Texas all have considerable areas requiring drainage, and all of them are moving in the right direction. Alabama, Missouri, Mississippi, Arkansas, Tennessee, Oklahoma have considerable bottom-land areas, but these are largely in cultivation, and the work remaining comparatively small. Ohio, Indiana, Illinois, Southern Michigan and Southern Wisconsin and Iowa at one time contained many millions of acres of swamps and marshes, but most of these lands are now the most valuable farms of these States, and the remaining swamps are in process of development.

In Minnesota are the largest swamps in the North. Northern Wisconsin, Northern Michigan and the Dakotas all have considerable drainage work to do, and in all of them, except possibly Northern Michigan, it is being pushed with vigor and success. California has led all the States in the reclamation of tide-water lands, notwithstanding the fact that the difficulties and expense are greater there than along the Atlantic and Gulf coasts. Thousands of acres of tule marshes in the San Juaquin valley have been leveed and pumped, and are now amply rewarding the energy and capital required in their reclamation. Even the new and undeveloped Northwestern States, Oregon and Washington, have outstripped the Eastern coast in this work.

Of the more than 80,000,000 acres conveyed to the various States under the Swamp Land Acts, much was not swamp land and should not have been conveyed under these acts. Millions of acres besides were not swamp as the term swamp is generally understood, including such lands as the Yazoo Delta in Mississippi, the Tensas Delta in North Louisiana and the alluvial lands of Tennessee, Arkansas and Missouri. These lands are, for the most part, slightly rolling, and with good natural drainage, except that they are within the flood plain of the Mississippi, and before the building of levees subject to annual inundation. These lands constitute now the great cotton-producing sections of the States named, and are valuable. Far more than half of the lands originally granted as swamps and overflowed are already drained or protected from overflow.

Beyond question the drainage of the remaining marshes and swamps in the United States is the most important natural development awaiting us, and is sure to be done by the present generation. Compared with the labor which has been expended in clearing of timber and stumps the lands already in cultivation, the remaining work is small. When our first farms were cleared and drained lands were cheap. Now good land anywhere in the United States is valuable.

This work should be pushed with vigor because of its economic necessity, because it will promote health and abolish unsightly nuisances, and finally because it will pay large profits with certainty.

And besides, the all-powerful instinct prevalent in all of the animate world to provide for succeeding generations will be satisfied. It is a part, and not a small one, in the building of the nation.

The Construction Department of the Manufacturers' Record covers 10 to 12 pages every week of detailed information about new enterprises; building notes, railroad work, municipal improvements, road and street improvements, sewer construction, lumber plants, electric-light and power plants, bridges, culverts, viaducts, etc., iron and steel, mining, textile, water-works, wood-working plants, street railways and miscellaneous work and a list of machinery tools and supplies wanted.

VARIOUS AND INCREASING USES OF CEMENT.

By William H. Stone.

[Written for the Manufacturers' Record.]

The growth of Portland-cement production in the United States from infancy 20 years ago to an output which amounted in 1907 to at least 55,000,000 barrels has been one of the most remarkable phases of recent industrial development. This growth for the first 10 or 12 years was a steady and gradual one. It was not marked by the vast increases in production for which the latter end of the 20-year period has been noted. The expansion of cement production is perhaps best shown by figures compiled by Edwin C. Eckel for a Government pamphlet on the cement industry of the United States. These figures show that up to 1895 the output gradually increased until it reached a total production of 1,000,000 barrels; in 1896 it jumped to 1,500,000 barrels; in 1897 to over 2,500,000; in 1898 to nearly 4,000,000; in 1899 to nearly 6,000,000; in 1900 to nearly 9,000,000; in 1901 to over 13,500,000; in 1902 to over 17,000,000; in 1903 to nearly 22,500,000; in 1904 to 26,500,000; in 1905 to over 35,000,000; in 1906 to 46,500,000, and in 1907 to at least 55,000,000 barrels. There has never in the history of Portland-cement manufacture been a retrograde movement in any year's production. The output for each year has always been in excess of the preceding one, at first a comparatively small increase, but in later years by leaps and bounds, and the tendency of the production has even had an increase in the rate of increase.

Although the wonderful growth in production in recent years can hardly be expected to continue in the same proportion in the years to come, yet the great and ever-expanding use of cement presages for the industry an activity that does not indicate any immediate curtailment in production; in fact, the results which have been accomplished from the substitution of cement for other materials in all classes of construction work have been so gratifying that its increased use and consequently increased production, or at least the maintenance of approximately its present production, can be looked forward to with a certain degree of definiteness.

The demand for the large production of Portland cement has been caused by the widely-varied uses to which it has been found readily adaptable, and these are constantly being added to by its adoption in new fields where other materials have always heretofore been used. The field of its usefulness is always a widening one, and its success in any one line holds out equal opportunities for the same degree of success in many kindred lines, so that no man today can point to the limits of its possibilities.

In reinforced-concrete construction it has attained remarkable results, and structures of this material are now common sights in all parts of the country. The practicability, stability and economy of reinforced-concrete structures has been well tested and found successful, notwithstanding the opinions to the contrary of those who are fighting its advancement, and although cases have been cited where it has been pronounced a failure, the after investigations have invariably proven that it was the carelessness of the contractor and not the materials or the systems which were at fault, and, moreover, this same sort of carelessness on the part of the contractor has caused the same kind of failures or collapses in structures of steel, wood or brick. It is safe to say that we have seen but the beginning of the construction of all classes of work, such as buildings, bridges, dams, culverts, viaducts, etc., of reinforced concrete, and the future will see its adoption in a still broader way and for even more diversified purposes.

Another field in which Portland cement has made rapid advances has been in the cement or concrete building-block industry. The expansion of this industry has been almost phenomenal, and while its products were crude at first, it has grown to where the concrete block has been perfected and has now become recognized as an important material for building construction work. A point that has been well made by the wise advocates of its advancement is that the industry should stand on its own merits as a cement block, because it is in itself such a worthy product that it is not necessary for its growth in use that it should be sold or advertised as an imitation of stone of any kind.

In order that some idea may be had of the wide expansion and diversified uses of cement in every phase of construction work, the Manufacturers' Record has gathered together a few illustrations and descriptions of results attained in various types of structures in which cement has been the predominate material used. These represent somewhat broadly the material's possibilities, and are indicative of the success which has been met by its substitution for other older materials. They also indicate that the material is adaptable to most every class of construction work.

The brand of Portland cement as made by the Atlas Portland Cement Co. of New York and the many and varied structures in which it has been used have at various times been fully set forth in three illustrated publications entitled "Concrete Construction About the Home and On the Farm," "Concrete Country Residences" and "Reinforced Concrete in Factory Construction." These publications gives one a splendid idea of the wonderful possibilities of the material, and also show a great many of the excellent results which have been made. The latter of these volumes, "Reinforced Concrete in Factory Construction," which has just been published, gives details of this type of construction, and it describes and illustrates many tpyical examples of concrete factory buildings erected in various parts of the country by representative builders. The work not only offers suggestions to the factory owner who is contemplating the building of a new factory, but it also gives to the architect and engineer a comprehensive idea of the advantages and limitations of the material as adapted to the factory. A unique example of reinforced-concrete construction taken from this volume and in the construction of which Atlas cement was used is shown in the accompanying illustration of the dyehouse of the Botany Worsted Mills at Passaic, N. J. This structure was built according to the Kahn system of reinforced concrete. The span between columns, as shown, is 21 feet, and the arch spans are approximately 24 feet. The building contains three of these groined naives, as shown in the cut, and they run the entire length of the structure, which is 925 feet. In addition to the structures shown in the various volumes, Atlas cement has been used in the following large construction undertakings during the year of 1907: Pennsylvania Railroad terminals and tunnels in New York city, Singer Building, the tallest in the world, New York city; La Crosse Water-Power Works at La Crosse, Wis.; Panama canal, water-power development at Pee Dee, N. C., and water-works at Blacksburg, S. C.

Probably one of the most notable pieces of reinforced-concrete work, from the standpoint of novel and interesting construction as well as from the engineering problems involved, is the railway viaduct at Richmond, Va., built during the past year for the Richmond & Chesapeake Bay Railway, and of which the accompanying illustration gives an idea of its design and construction.

This viaduct, which is over 2800 feet long and 70 feet to base of rail at highest point, is an immense monolith, being built entirely of reinforced concrete according to the Kahn system. The Kahn "trussed bar" was used throughout for reinforcement. When the railroad company sought entrance to Richmond for the extension of its line from Ashland, 16 miles distant, it found itself confronted with a serious problem. Local conditions made it necessary to elevate the tracks; at the same time danger of fire prohibited the use of timber trestles. Steps were first taken to secure a design with steel trestles, and bids had already been obtained when the attention of C. P. Burgwin, who was at that time in charge of the work, was called to the advantages of reinforced concrete. A thorough investigation was made, which resulted in the adoption of reinforced concrete not only on account of its lower cost and greater speed of erection, but also because of its wonderful stability and freedom from decay. The contract for the work was awarded to Mr. John T. Wilson of Richmond upon a design submitted by the Trussed Concrete Steel Co. of Detroit. To give an accurate idea of the problems involved a technical description is necessary, which is of little interest to the general reader. It is of interest to note, however, that besides being 70 feet high at certain points, the viaduct contains spans 67 feet 5 inches long from center to center. Before accepting the finished work the viaduct was subjected to severe test under the supervision of Mr. J. H. McClure, chief engineer of the railroad company. A locomotive and its tender, with two steel gondola cars loaded with rails, weighing 150,000 pounds each, were used for the test. The first test consisted in running this train, headed by the locomotive, the full length of the viaduct. The train was then run back and the deflections measured for several spans. A test was then made by breaking the train at various points of the viaduct. The last test was running the train at a speed of over 35 miles per hour. In all, the test train made seven trips. The result was a complete triumph for the structure and for the engineer who planned and designed the work.

ARCHES SUPPORTING DYEHOUSE FLOOR, BOTANY WORSTED MILLS, PASSAIC, N. J.

Another important field in which reinforced concrete has met with unusual success has been in the construction of large sewers. The city of St. Louis is now building one of this character which is of more than ordinary interest, and which is known as the Harlem creek sewer.

When it was decided to build the sewer, the subject of reinforced concrete having been brought to the attention of the sewer commissioner, it was thought best, after an extensive investigation had been made by the department, to use this modern method of engineering design, and it was found by actual comparative figures that a decided saving could be made over the necessary brick design by installing an intelligently considered section of reinforced concrete, although at the time the subject was approached with some trepidation by the contractors bidding on the work. The results obtained in the practical installation of the material required have borne out the estimates made before the work was commenced.

The sewer itself is to have a total length of about 4800 linear feet, in addition to which there is contemplated a joint district sewer three miles in length. Of the work now under contract 200 feet are of 29-foot arch, 1300 feet of 27-foot arch, 3300 feet of 25-foot arch. The proposed joint district sewer will be about a nine-foot arch.

The illustration given herewith will give the reader a more definite idea as to the methods employed in installing the work, the forms being so built as to enable them to be collapsed and moved forward on iron rails and realigned into place. The reinforcing bars were bent to a template by means of a wagon-tire bender, and the cost of this manipulation was entirely satisfactory.

For the work originally contracted for, comprising 2200 feet, there was required approximately 35,000 barrels of cement and 1000 tons of reinforcing bars. The cement used was Red Ring brand, made by the St. Louis Portland Cement Co. The reinforcing bars were of the Johnson corrugated type, supplied by the Expanded Metal & Corrugated Bar Co. of St. Louis.

The work was designed and installed under the immediate supervision of Mr. H. R. Fardwell, sewer commissioner, and Mr. J. A. Hooke, assistant sewer commissioner. The Hoffman-Hogan Construction Co. are the contractors for the first 2200 feet, the contract for the remaining 2600 feet having just been let to the Prendergast Contracting Co., St. Louis.

In modern dam construction concrete has now become accepted as an absolute necessity, and its use in this class of construction work may be said to be universal. An undertaking of this character is shown in the illustration of lock and dam No. 1, now in course of construction by the National Government on the Mississippi river about midway between Minneapolis and St. Paul. This work is being done with a view to increasing the depth of water to about five feet and increasing the river traffic by making the Mississippi navigable at least to the foot of St. Anthony falls in Minneapolis.

This lock is of reinforced-concrete construction. Cofferdams were first built, and then a very heavy concrete floor, in which was imbedded tiling to underdrain and prevent water washing out or undermining cement floor. At the present time the floor is almost complete, as is also two-thirds of the land side wall of the lock.

The Government has its own plant, crushes its own rock and digs its own bank sand, which is found near the work, and after the stone is quarried and hoisted it is transported to a storage bin and to the concrete mixer by gravity, and from the mixer to the work in small dump cars.

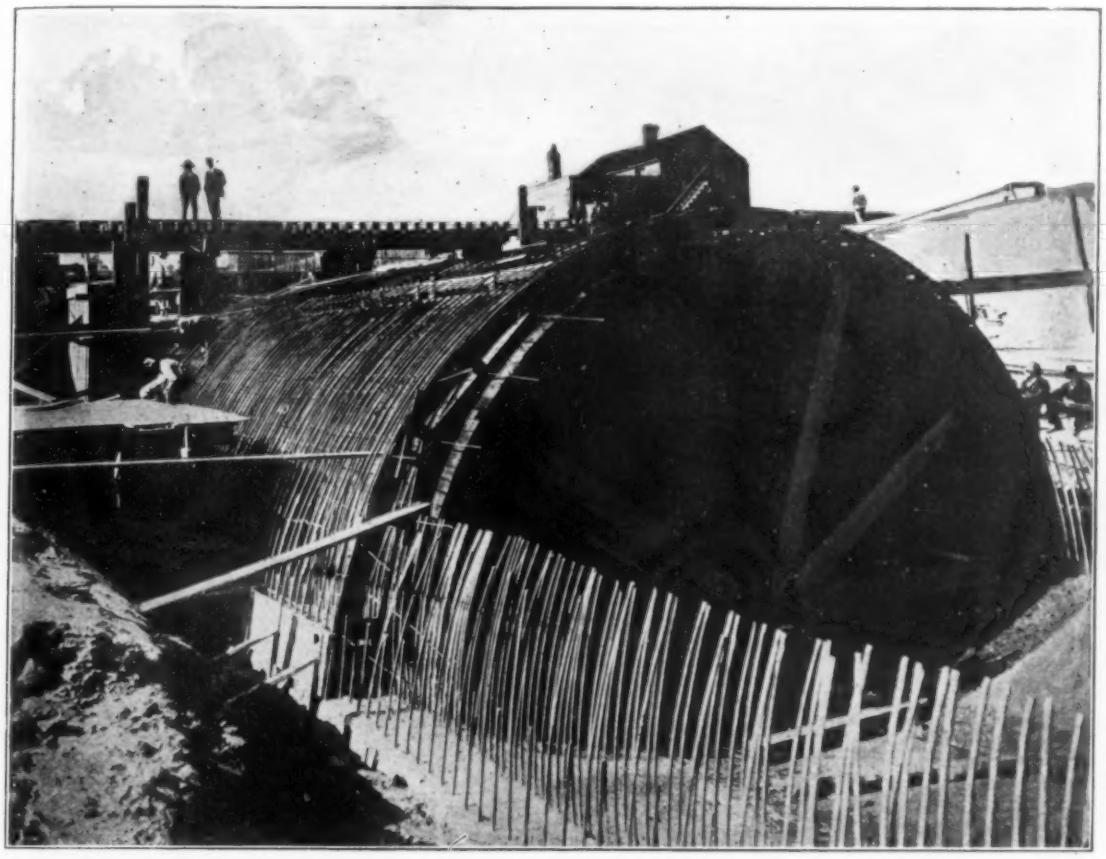
The Government purchases the cement, stores it in building convenient to the work and tests it in its own laboratory, which is located on the site.

The first lot of cement, amounting to 5000 barrels, was purchased from the Universal Portland Cement Co. of Chicago, and remained in storage nearly a year before using, after which it was thoroughly tested and proved highly satisfactory under the Government specifications, and the next lot of 5000 barrels was purchased and used as soon as tests were completed.

A striking example of the adaptability of reinforced concrete for the construction of the varied buildings of a large industrial establishment is the 22 buildings of this character at the plant of the National Phonograph Co. in Orange, N. J. These include such structures as power-house, boiler-house, machine shop, wax plant, assembling building, carpenter shop, record building, office building, oilhouse, polishing shop, gas plant, gasholder house, gas generator house, storage battery building, storage battery washhouse, nickel-plating shop and purifying furnace. They range from one to six stories in height, and are of reinforced-concrete construction throughout, including the roofs. They cover a total floor space of 530,485 square feet, or over 12 acres. The brand of cement as manufactured by the Edison Portland Cement Co., New York, was used exclusively in all of the construction work, the amount being about 60,000 barrels. A

REINFORCED-CONCRETE VIADUCT OF THE RICHMOND & CHESAPEAKE BAY RAILWAY.

number of these buildings are shown in the accompanying illustration, which



REINFORCED-CONCRETE SEWER IN ST. LOUIS, MO.

gives an excellent idea of their design and construction. They were all designed and constructed under the supervision of H. I. Moyer & Co., 375 Fulton street, Brooklyn, N. Y.

The construction of large chimneys of reinforced concrete is another important phase of the cement industry, and the several companies which have made a specialty of this character of work have built many of them in all parts of the country. An accompanying illustration shows the type of tapering reinforced-concrete chimney as designed and built by the Concrete Construction Co. of Philadelphia.

The most recent work of this company, which is now in progress, is the construction of a chimney for the Home Electric Light & Steam Heating Co., a subsidiary company to the American Railways Co., at its new power plant at Tyrone, Pa. This stack will be 175 feet high by 8 feet inside diameter at the top. It will have the same batter as would the brick chimney.

Test borings showed the upper soil at the chimney site to be of poor load-carrying capacity. To avoid the driving of concrete piles the foundation was excavated to a depth of 13 feet 9 inches, where hard-pan was reached. Work of placing the foundation, 22 feet square, was then begun. The Johnson high-carbon steel bar, made by the Expanded Metal & Corrugated Bar Co. of St. Louis, was selected for the reinforcement. Three-quarter-inch corrugated bars were used in the foundation and for vertical reinforcement in the chimney column.

CONCRETE LOCK AND DAM ON MISSISSIPPI RIVER.

One of the features of the chimney is the buttress, which has been built around the smoke opening, 11x5 feet in size. Three feet above and below the smoke opening the vertical reinforcing bars, which would have passed down through the breech, were sawed off. To these were spliced bars bent to a length to give a lap of four feet and extending down through the 21-inch buttress wall around the opening for the breeching. The horizontal reinforcement, which in other parts of the chimney consisted of five-eighths-inch square corrugated bars spaced 16 inches center to center, was increased.

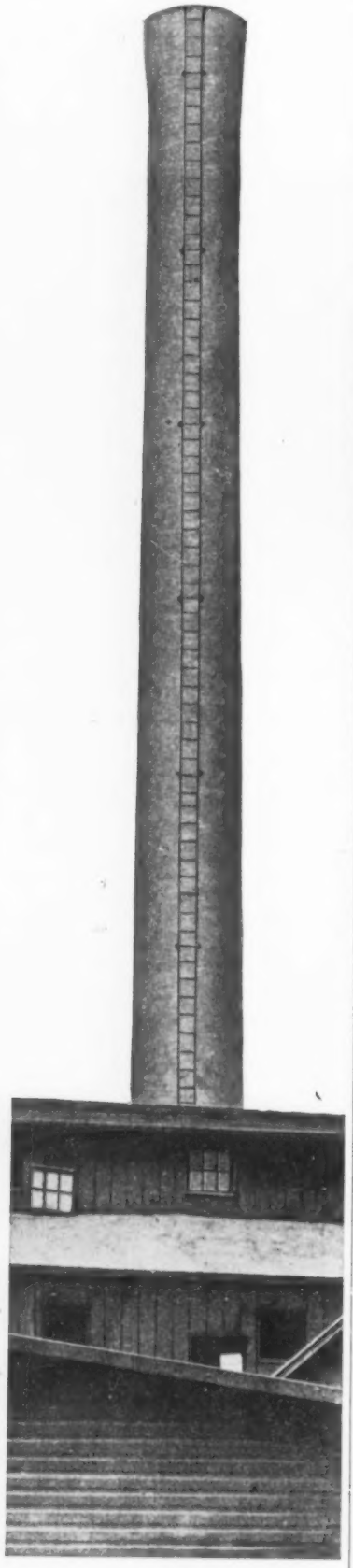
When completed the chimney will be supplied with an interior ladder and three-point lightning rod of the Ajax Conductor & Manufacturing Co. of Chicago, Ill. The ground terminals of the conductor were placed at the same time as the foundation of the chimney at a depth of 13 feet 9 inches below grade.

The illustration of the new reinforced-concrete power-house at the United States Naval Academy, Annapolis, Md., gives a splendid idea of the possibilities of this type of construction. This structure was designed by Ernest Flagg of New York, the architect for all of the new Naval Academy buildings, and it was constructed by the Baltimore Ferro-Concrete Co. of Baltimore, Md. The cost of the building as it stands in the illustration was $54,930. Work was commenced in March, 1907, and the structural work completed July 20. The concrete structure consists of columns carrying the floors, roof, coal bunkers and traveling crane, but not the outside walls, which are self-supporting, and main floor, with a cement finish and designed to carry 150 pounds per square foot, the boilers and small machinery being carried on this floor, while the large engines will have separate foundations. The traveling crane, running on concrete girders, is to carry a load of 30 tons. The overhead coal bunkers are finished inside with cement and are designed to carry 5000 tons of coal. Other features of the building include galleries in engine-room and winding stairways, trussed roof, conveyor floor for coal conveyors and crushing machinery and monitor. The quantity of materials used in the construction work was approximately 2000 barrels of cement, 250 tons of steel, 1500 tons of gravel and 825 tons of sand. The reinforcement consisted of plain, round, medium steel bars, and gravel was used exclusively for the

GROUP OF REINFORCED-CONCRETE BUILDINGS, NATIONAL PHONOGRAPH CO.

concrete mixture. On the day of the completion of the work the floors were tested by the Naval Academy officials and the building accepted at once.

The illustration showing the garage now being built for the Citizens' Motor Car Co. in Cincinnati, Ohio, gives to those interested in this important industry a splendid idea of the value of such a struc-



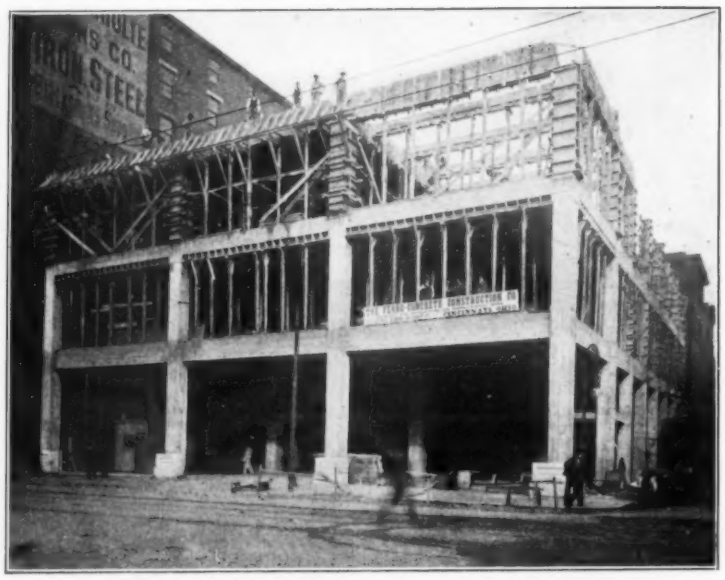
TYPICAL CHIMNEY OF CONCRETE CONSTRUCTION CO.

ture for garage purposes. This structure is 92x131 feet, and although the present building is to be but three stories in height, the columns and footings have so been constructed that five extra stories can be added if desired. The building will have exterior walls of brick and terra-cotta, which will be anchored to the concrete skeleton. The illustration shows two completed stories and the partially-finished forms of the fourth floor. A mezzanine floor extends around the building, suspended from the second floor by one-and-one-quarter-inch round hangers. This floor will be used for chauffeur rooms. The plans and specifications for the building were made by Samuel Hannaford & Sons of Cincinnati, and the Ferro-Concrete Construction Co. of Cincinnati, Ohio, were the contractors.

REINFORCED-CONCRETE POWER-HOUSE, U. S. NAVAL ACADEMY.

The development of the concrete or cement building block through its successive stages up to practical perfection forms one of the most interesting features of the varied value of cement. This industry has enjoyed remarkable and gratifying success in the past, while the future holds out for it prospects of even greater success, together with a still broader field in the general building industry. So well, in fact, have its details been perfected that its use in the higher grades of architectural work, involving much ornamental design, has been met with marked success. The three illustrations shown here testify to its merits and adaptability both structurally and architecturally, and indicate in a small way the future possibilities of the industry. The Methodist church shown was erected at Sterling, Ill., and is a concrete-block building throughout, including all ornamental work, and it is strongly indicative of the cement block's future from an architectural standpoint. The blocks for this building were made on a Winget machine, "A" outfit, which is manufactured by the United Cement Machinery Manufacturing Co., Inc., of Plain City, Ohio, this company being a consolidation of a number of concrete-block machinery makers, including the H. S. Palmer Company of Washington, D. C.; the Cement Machinery Manufacturing Co. of Burlington, Iowa, and others.

Another interesting phase of the use of the concrete block in the building-construction field is shown in the illustration of the four-story double warehouse of the Patapsco Oil & Grease Co. in Baltimore, Md. The structure was built of blocks made by the National Hydraulic Stone Co. of Baltimore under the system of the Fisher Hydraulic Stone & Machinery Co. of Baltimore, which also manufactures and sells the required machinery. The walls of the structure are of three-piece construction, thus providing a double continuous horizontal and vertical air space, which renders it impossible for moisture, or, as in this case, of oil permeating through it. The second, third and fourth floors of the building are used for storage purposes, and consequently carry very heavy weights, there being ofttimes two solid tiers of filled barrels on each of them. This, together with the fact that the structure has now been in use for over two years, indicate the stability and durability of the concrete block in construction work

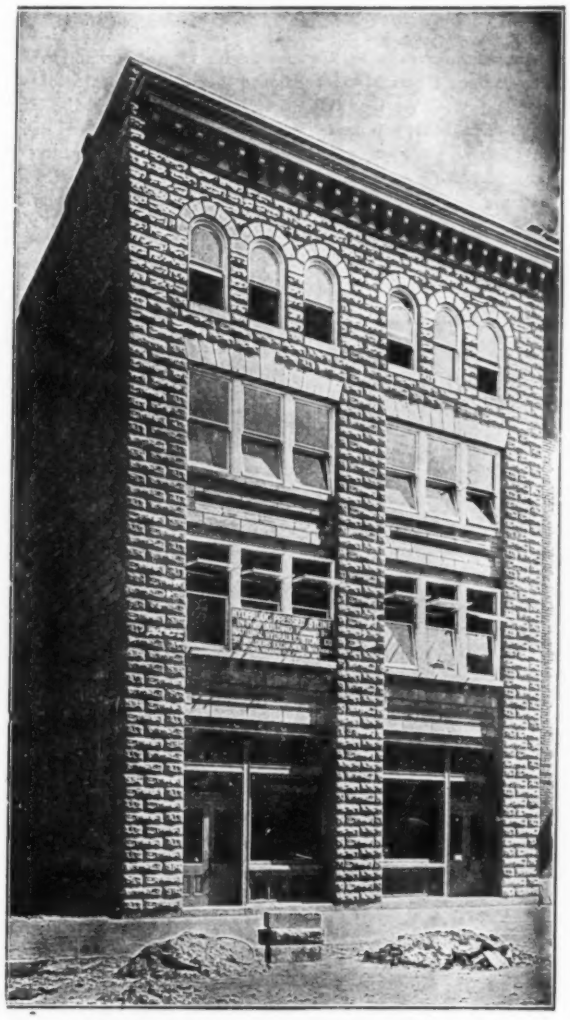


REINFORCED-CONCRETE GARAGE, CINCINNATI, OHIO.

CONCRETE BLOCK METHODIST CHURCH, STERLING, ILL.

where the heaviest weights are to be carried on floors.

Another instance of the varied uses of the concrete block is shown in the illustration of the three-story hotel which was



PATAPSCO OIL & GREASE CO.'S WAREHOUSE.

erected at Fruitvale, Cal. This structure is also built throughout of concrete blocks, and altogether presents a very pleasing architectural design and finish. The

structures built throughout of reinforced concrete is that of warehouses, freight terminals, etc. The illustration shown herewith of the freight terminals of the Louisville & Nashville Railroad at Atlanta, Ga., is a striking example of this class of structure. It is five stories in height and 50x853 feet, and is constructed in its entirety of reinforced concrete. As will be noticed

oughly fireproof by reason of the material used, but it is also protected from fire on the outside by metal frame and sashes, thus making it representative as near as it is possible of an absolute fireproof structure. In the construction of the building about 17,000 barrels of cement, made by the Southern States Portland Cement Co. of Rockmart, Ga., was used, and in the construction of the viaduct approximately 6000 barrels of the same brand of cement. About 600 tons of reinforcing metal was used, this being furnished by the Atlanta Steel Hoop Co. The construction work was done by the Ferro-Concrete Construction Co. of Cincinnati, Ohio.

CONCRETE BLOCK HOTEL, FRUITVALE, CAL.

The original source of water supply for the city of Lynchburg, Va., was from the James river. During the past 10 years the water of the James has become considerably polluted, owing to the large number of manufacturing plaints draining their refuse into the stream. The enterprising people of Lynchburg determined that they would have a supply of water that would be free from all pollution, and

Chauncy G. Williams of Lynchburg and New York.

The large dam, of which an illustration is given, was built on the Pedlar river, at the foot of the Blue Ridge mountains, 25 miles from Lynchburg.

This dam is 420 feet long on top, with 150-foot spillway. Its height to crest of spillway is 61 feet. The construction work contains 19,000 cubic yards of concrete and 500 cubic yards of granite masonry.

The water from the dam is piped into the city, and at all seasons an ample supply of good palatable water is provided for its citizens. In the construction of the entire water-works system Old Dominion Portland cement was used exclusively, amounting in all to 22,000 barrels, and was furnished by the Wm. G. Hartranft Cement Co. of Philadelphia, Pa.

These few illustrations of what has been accomplished in the use of cement in general construction work point out the vast possibilities of this material and the broad field which still lies before it. Day by day

REINFORCED-CONCRETE TERMINAL BUILDINGS, LOUISVILLE & NASHVILLE RAILROAD, ATLANTA, GA.

blocks for this building were made from the face-down machines as manufactured by the P. B. Miles Manufacturing Co. of Jackson, Mich.

Perhaps one of the leading classes of

in the illustration, the Washington-street viaduct passes through the center of the building, and the north end of this structure is also of reinforced-concrete construction. Not only is the building thor-

engaged Mr. Jas. H. Fuertes of New York as consulting engineer, who, with Mr. H. L. Shaner, chief engineer, designed the new water-works system and awarded the contract for all the work to Mr.

the advantages of the use of cement in city and country, in construction of dwellings, warehouses, churches, water-works, pavements, conduits, fenceposts, bridges, etc., are becoming more and more appreciated

and are being ever more practically availed of. And even yet the cement industry has hardly passed beyond its infancy, as far as the demands upon it are concerned.

Timber for Matches.

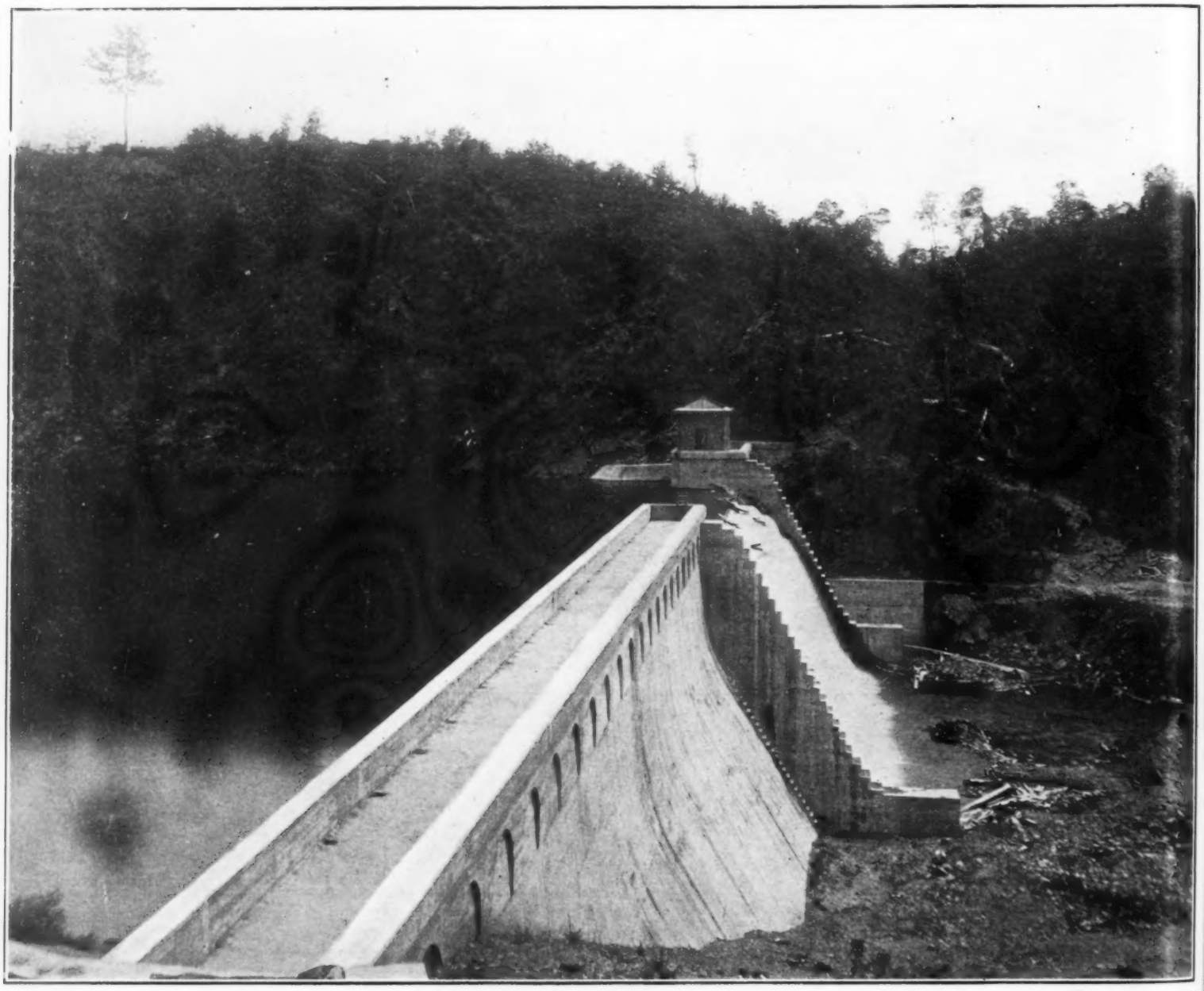
[*Southern Lumberman.*]

There are only two things in common use that we can think of that a gentleman of refinement can ask for of an utter stranger without feeling something of a lowering of dignity and self-respect. These two are a chew of "tobacker" and a match. In some parts of the country "Mister, gimme a chaw of terbacco" is as common as "howdy." In all parts of this country and among all classes of its people it is nowhere and under no circumstances, except, perhaps, where smoking is prohibited, considered "bad form" for a gentleman to request the "loan" of a match from an utter stranger. And it is curious to see how quickly the stranger's thumb and forefinger will dive into his pocket or to note the expression of genuine regret that passes over his face as he replies, "Beg pardon, sir, but I haven't got one." Did you ever notice it?

Someone with leisure and a penchant for statistics has figured out that in the civilized world 3,000,000 matches are struck every minute during every 24 hours of the day, and that half that number are burned in the United States. The total number of matches consumed in the United States in one year is put at 700,000,000,000—an inconceivable number to most people. There are several hundred match factories in this country, some of them very large. One on the Pacific coast covers 240 acres and has 32 miles of railway that deliver 200,000 feet of sugar pine and yellow pine daily. To the average man a single match represents a very small amount of timber, but it really requires several feet to make it. The match-making department of a match factory is the least part of the plant. The big plant above mentioned, in addition to millions of matches per day, produces, as by-products, 1000 doors and 800 sashes daily, besides lumber, shingles, lath, studding, posts, siding, cordwood and many other things. The match itself must be of the very best straight-grained wood to withstand the lateral strain when it is scratched, and a great many of the best ones break in the process of striking them.

The different factories make matches in different ways with machines especially invented for their own use, and the ignition compounds are prepared by their own chemists and the ingrédients and process kept a profound secret. Some square matches are sawed both ways from blocks cut to match lengths. Some factories boil the blocks and cut them into squares. One factory at Ashland, Ohio, makes a round match by driving the wood through dies, putting igniting compound on the end with a band of non-friction igniting material just behind, so as to make ignition from side impossible. Some of the machines for making matches are extremely ingenious and complicated, and under a test one machine is known to have turned out 177,920,400 matches in one day, boxed, labeled and ready for shipment. A certain American match company not long ago sold its machines, patents and secret methods to a French company for $100,000 cash and $100,000 each year as royalty. With the best timber in the world and about 150 match factories in the United States and about half that number in Canada, we do not make enough matches to supply our home demand, and import annually many thousand dollars' worth from Germany, Austria, France, Sweden and Mexico. These imported matches are largely of the "safety" kind and have to be scratched on the box or other prepared surface. Some of these "safety" matches are made of fiber coated with wax, and are to all intents and purposes tiny candles. The Chinese match is made of paper, but all Euronean and American matches are made of wood. In Germany the aspen is preferred. Most other countries in Europe use the pines. In America the woods mostly used are pine, linden, aspen (a species of cottonwood—Populus tremuloides), white cedar, poplar, birch and willow. The match factories are searching the country for suitable woods, and many of them hold large bodies of timber for present and future use. The fact is that the makers of matches of this country are as close up to a timber famine as any other class of woodworkers, and there are few kinds of woods that are suitable for matches, and substitutes are out of the question. European countries are worse off than we. Germany has been importing willow from Russia to such an extent that the Minister having that matter in charge has petitioned that the exportation of willow from that empire be forbidden. The German matchmakers have asked their forestry department to plant a greater percentage of aspen upon the crown forest lands. Doubtless our own forest service, when it gets to work in earnest, will receive similar requests.

As now manufactured in the United States matches cost about one cent per thousand finished, counted, put in boxes of 50, 100, 500 or more, labeled and ready for shipment, and are sold by retail in the box at about one cent per hundred. About 25 matches for every adult and child, white, colored and Indians, are used every day in the United States continental limits.



CONCRETE DAM OF WATER-WORKS SYSTEM OF LYNCHBURG, VA.

The Daily Bulletin of Manufacturers' Record is published every business day in the year, and is invaluable to engineers, architects, manufacturers, railroad contractors and to business men generally who are interested in receiving daily and authentic information about the South.

Cement Users' Convention.

The program as fas as completed for the convention of the National Association of Cement Users, to be held in Buffalo, N. Y., January 20-25, is remarkably good, a wide range of subjects being covered, and much valuable information will be secured by those who attend the proceedings. The afternoons of each convention day are to be left open, so that members may visit the exhibition which is to be held in the old Sixty-fifth Regiment Armory.

In addition to the annual address of President Richard L. Humphrey and other officers and reports of chairmen of the committees on important phases of the industry, the following papers will be read: "Cement Sidewalks," by C. W. Boynton, Chicago, Ill.; "Elementary Mechanics of Reinforced Concrete," by Prof. W. H. Hatt, professor of civil engineering Purdue University, Lafayette, Ind.; "Factory-Built Concrete," by W. H. Mason, superintendent Edison Portland Cement Co., Stewartville, N. J.; "Co-operation: What It Is and What It Can Accomplish," by Robert W. Lesley, president American Cement Co., Philadelphia, Pa.; "Concrete as a Plastic Material for the Expression of Architectural Ideas," by Irving K. Pond, architect, Chicago, Ill.; "Artistic Effects in Reinforced Concrete," by Ross F. Tucker, president Concrete Association of America, New York city; "Exposed Selected Aggregates in Monolithic Concrete Construction," by Albert Moyer, New York city; "Progress in Manufacture and Use of Cement Building Blocks," by A. N. Pierson, East Orange, N. J.; "Practical Methods Involved in the Erection of a Reinforced-Concrete Building," by H. H. Fox, superintendent Turner Construction Co., New York city; "The Unit vs. the Loose Bar System of Reinforced-Concrete Construction," by Emile G. Perrot, architect, Philadelphia, Pa., and "Progress in the Investigation of Cement Mortars and Concretes in the Structural Materials Testing Laboratories of the United States Geological Survey, St. Louis, Mo.," by President Richard I. Humphrey of the association.

The Paymaster-General of the Navy informs the MANUFACTURERS' RECORD that the Bureau of Supplies and Accounts of the Navy Department has neither the desire nor the power to exclude any reputable dealer from bidding on naval supplies. All bids from such persons will be given the same consideration and in each case award will be made to the lowest formal responsible bidder. By reason of the onerous requirements under the old form of contract many responsible firms were unwilling to deal directly with the bureau. By removing these onerous conditions it is hoped by the bureau that such firms will bid directly for the navy business, and by thus widening competition give to the navy better prices and prompter deliveries.

It is announced that the State of Mississippi will spend shortly $25,000 in planting 500,000 barrels of oyster shells in the Gulf for the promotion of the rapidly-expanding oyster industry in that region.

The Louisiana Alluvial Land Co. has been formed with E. W. Wickey of New Orleans president for the purpose of reclaiming 50,000 acres of land near Raceland, in Lafourche parish, Louisiana.

The Louisiana Commercial and Industrial League has been organized at New Orleans with Mr. S. Odenheimer temporary chairman and J. W. C. Wright secretary.

The Manufacturers' Record has a quarter of a century of untiring work for the upbuilding of the business interests of the South and of the country at large, to its credit.

MINING

New Company Organizes.

Capitalists of Middlesboro and Covington, Ky., have organized the Lignite Coal Co., with a capital stock of $100,000, to develop coal lands which have been leased near Middlesboro. The property consists of about 1300 acres of land located on Stony fork, and was leased from William Givens of Middlesboro. The company is reported as intending to begin development work soon, to facilitate which it will probably construct three miles of railroad from the property to the Stony Fork branch of the Louisville & Nashville Railroad. Incorporators of the company are Messrs. George Beach, A. E. Radkin, W. E. Gunn and John Hoffman, all of Covington, and J. G. Fitzpatrick, Joseph F. Bosworth, E. S. Helburn and A. H. Rennebaum of Middlesboro. Mr. Beach is the president; J. A. Downard, vice-president, and John Hoffman, secretary-treasurer.

Contemplates Development.

Capt. H. J. Budd of Knoxville, Iowa, and A. J. Van Allstine of Omaha, Neb., are reported as negotiating with John A. Wyshard of Nebraska looking to the development of 150,000 acres of cement-bearing lands in Kent county, Texas, owned by a company of which Mr. Wyshard is president. It is estimated that 6,000,000 tons of cement are now available for use, being on the surface of the ground, and a pony plant is at present in operation preparing 160 sacks per day. It is understood that if Messrs. Van Allstine and Budd acquire an interest in the property they will establish a large cement plant and will also provide railroad facilities. Mr. R. C. Lomax of Fort Worth, Texas, is reported as being interested in the enterprise.

Pittsburg Steam Coal Co.

The Pittsburg Steam Coal Co. of Fairmont, W. Va., referred to last week as intending to incorporate with a capital stock of $25,000 to develop 26 acres of coal land and to acquire 100 acres additional, informs the MANUFACTURERS' RECORD that it will install a plant to cost about $50,000. It will also construct coke ovens, but has not decided definitely as to the number. The company will develop a nine-foot Pittsburg vein of coal, producing about 500 tons daily, and expects to be in operation by March 1, 1908. Mr. George Porter of Uniontown, Pa., is the engineer in charge of construction work. Officers of the company are Messrs. W. D. McGinnis, president and treasurer, and J. R. Bailey, secretary and manager.

West Virginia Development.

Referring to its plans for the development of coal lands in West Virginia, the E. R. Johnson Coal Mining Co. of Roanoke, Va., advises the MANUFACTURERS' RECORD that it will develop a lease on Crooked creek of approximately 1600 acres near Logan, in Logan county. It is intended to install a mining plant to have a daily capacity of 1500 tons. Officers of the company are E. R. Johnson of Detroit, Mich., president; Edw. L. Stone of Roanoke, vice-president, and J. B. Hudson of Logan, W. Va., manager. The secretary and treasurer have not been elected, but it is expected to complete the organization of the company by January 15, 1908, at which time development work will begin.

Plant to Cost $150,000.

The MANUFACTURERS' RECORD is informed that the Kendalia Coal & Coke Co. of Wheeling, W. Va., recently incorporated with a capital stock of $150,000, will develop 1500 acres of coal lands in Kanawha county. A mining plant to cost $150,000 will be installed and 100 coke ovens constructed. The capacity of the mines will be 2000 tons per day. Officers of the company are E. L. Perkins, president; A. S. Bell, vice-president and general manager; E. G. Perkins, secretary, and A. H. Werder, treasurer. Mr. A. S. Bell of Wheeling is the engineer in charge of construction.

For Storage Purposes.

It is said to be the purpose of the Navy Department to secure, if possible, the dual pier and basin at the Jamestown Exposition grounds for coaling purposes. The pier was erected by the Government at an expenditure of $380,000, and can be made available, it is stated, for storing 100,000 tons of coal. It is pointed out that barges of the sort that are used for transferring coal from the shore to warships in Hampton Roads can lie in the basin loaded and safe in any kind of weather.

Exploiting Copper Deposits.

It is announced that Messrs. Worthington and Brown, who own copper deposits at Cedar Glades, about 15 miles northwest of Hot Springs, Ark., have established two mining camps on the property and will begin development work immediately. Shafts and tunnels will be opened and the ore removed, but it is said to be the intention of the owners to hold it for future shipment.

E. E. White Coal Co.

Among the new corporations chartered in West Virginia last week was the E. E. White Coal Co. of Beckley, W. Va. This company has an authorized capital stock of $500,000, and its incorporators include Messrs. E. E. White, Veris Austen and F. M. Ritcher of Mt. Carmel, Pa.; J. M. Humphrey of Centralia, Pa.; R. S. Daddow of Ashland, Pa., and various others.

The Blocker Coal & Land Co. of Fort Smith, Ark., has been incorporated with a capital stock of $100,000 by Messrs. T. L. Wright, W. F. Blocker, A. N. Sicard, O. E. Carnes, A. H. Ritter, Lee Rogers and T. C. Burford, all of Fort Smith.

Wants Woodworking Plants.

Mr. S. L. Moore, chairman of the industrial committee of the Commercial Club of Center, Texas, writes to the MANUFACTURERS' RECORD as follows:

"The Santa Fe is building out of here, connecting us up with the rest of the world. We have a live little town here of about 4000 inhabitants, and there is a splendid opening for a handle factory, chair factory, furniture factory or woodworking factory of any kind. There is plenty of cheap raw material, labor is cheap, and we will soon have excellent railroad facilities. We also need an ice and electric-light plant badly, sugar-cane and syrup mills, etc."

In 1906 Tennessee produced 17,809,442 pounds of blister copper, an increase of more than 3,000,000 pounds over the production of 1905. The output was almost entirely by the Tennessee Copper Co. and the Ducktown Sulphur, Copper & Iron Co. of the Ducktown district, in the southeastern part of the State.

The Manufacturers' Record numbers among its contributors the leading experts of this country. It broadly discusses every important question affecting national progress. It has been the foremost paper in the country in pointing to the fact that traffic is increasing more rapidly than railroad facilities. It has therefore unceasingly advocated a vast expansion of railroad construction and the development on the broadest scale of the rivers and harbors of our country to meet the necessities of the times.

LUMBER

[A complete record of new mills and building operations in the South will be found in the Construction Department.]

As to Closing Mills.

Secretary Lewis Doster of the Hardwood Manufacturers' Association of the United States, offices in the Stahlman Building, Nashville, Tenn., has issued a report detailing the result of a canvass started on December 2 to ascertain conditions among the mills throughout the hardwood-producing territory of the United States relative to their production in the immediate future. Reckoned on a monthly basis of manufacture, the report shows that 343 mills, with a normal production of 159,885,000 feet, have reduced their output 107,832,000 feet and are now producing 52,053,000 feet. The percentage of mills reporting closed is estimated at 60 per cent., and the percentage of curtailment of output at 67 per cent. It is estimated that 75 per cent. of the mills reporting closed down will not begin operations before March 1, 1908, or later. In addition, it is stated that a great number of the mills which will continue operating have advised that they are compelled to do so in order to protect themselves, as the log supply is in such a condition that it must be sawed at once, and still others are under contract to remove timber from certain tracts in a given time.

Wants 1,000,000 Feet of Lumber.

The Georgia Creosoting Co. of Ficklin, Ga., wants prices on yellow pine as follows: 3x8 inches, any length from 8 to 20 feet, 85 per cent. heart; 3¼x4¼ inches by 16 feet, 75 per cent. heart; 3¼x4¼ inches by 16 feet, 100 per cent. heart. This lumber must be perfectly sound and free from loose or rotten knots. About 1,000,000 feet will be wanted during the spring months.

Forest Reserve in Arkansas.

President Roosevelt has signed a proclamation creating the Arkansas National Forest Reserve in the west central part of Arkansas, covering more than 1,000,000 acres. It is located in Scott, Polk, Montgomery, Logan, Perry, Saline, Yell and Garland counties.

For Cooperage Manufacturers.

D. L. Jennings of Spartanburg, S. C., wants addresses of manufacturers of cooperage stock—staves, hoops and heading.

Lumber Wanted.

The High Point Bending & Chair Co. of High Point, N. C., wants proposals on lumber—hardwood and short-stock lots.

Will Want Telephone Poles.

The Amity Telephone Co., J. T. Goodman, manager, R. F. D. No. 2, Box 60, Mt. Ulla, N. C., will want telephone poles.

The Mississippi Yellow Pine Association will meet at Hattiesburg on January 3 to discuss trade conditions.

The Raywood Company.

The Raywood Company of Houston, Texas, is to irrigate 32,000 acres of land, not 2000 only, as lately stated by typographical error. This company's plans for manufacturing paper pulp from rice straw and for other industrial enterprises will be advanced as rapidly as possible.

The South has the resources with which to duplicate the world's cotton manufacturing industry; the world's iron and steel trade; the world's coal production; the world's electrical development; the world's marble and granite industry; and yet these are only a few of its natural advantages.

TEXTILES

Additions to Southern Mills in 1907.

The past year's announcements of spindles and looms to be added to the mill industry of our cotton-growing territory totals 664,381 spindles and 4776 looms. It may be conservatively estimated that $16,500,000 will be represented in the construction of the buildings and the installation of the machinery for those plants. During the fourth quarter of 1907 the announcements were for 136,300 spindles and 2980 looms, an investment of about $3,400,000, an increase over the corresponding period of 1906, when there was no financial stress. In this 1907 quarter it happens that plans for new mill equipments, 26,300 spindles and 354 looms, are greater than those for enlarging mills—11,000 spindles and 2626 looms. It is not often that the three-month periods are in favor of the new mills. The past year does not equal the record made in 1906, the spindles and looms then having totaled 794,034 and 9871, a $19,850,850 investment. During 1905 there were 430,540 spindles reported, a $10,763,500 investment. But construction of buildings was more than usually active last year, and many mills were completed, as detailed heretofore by the MANUFACTURERS' RECORD.

Thus it is seen that for the year 1907 the Southern cotton-mill industry has made a creditable record in the adding of spindles and looms to the equipments already in position. Throughout the entire 12 months, not even excepting the period of financial depression, new mill companies have been organized and established enterprises have decided upon additions to their plants. Southern manufacturers of cotton yarns and cloth continue to give their attention to the movement for the production of finer grades in both articles, yet the majority of the mills are equipped for making the standard grades of yarn and cloth for which the South has found a ready market.

A very noticeable trend of the industry is in the extension of the use of electricity as the motive power of the machinery used. Many plants have their own apparatus for generating the electricity, but the greater number of those using electrical energy are obtaining, and hundreds more will obtain, their supply from power-distributing corporations. Especially in North Carolina and South Carolina is the use of electrical power destined soon to be a more important factor than ever, as in these States the Southern Power Co. is distributing thousands of horse-power to various industries, principally cotton factories, and will eventually be furnishing more than 150,000 horse-power. In September last the Southern Power Co. had on file contracts to furnish electricity to 62 cotton-mill companies, operating 500,000 spindles. Nearly 50 of those mills are in North Carolina; the balance are in South Carolina. Between 30 and 40 mills are now using the power. The above data and various other indications of the progress of the industry are readily appreciated by glancing through the textile news columns of the MANUFACTURERS' RECORD for the past year. The MANUFACTURERS' RECORD has for years pointed out that the fact that experienced cotton manufacturers were the ones who installed most of the Southern spindles is an emphatic evidence of the advantages of the cotton-growing section. For surely no men could more thoroughly know and appreciate Southern possibilities than those who have invested their money in the Southern mill industry and gained their knowledge by actual experience. That many well-known textile manufacturers and mill investors of the North have also built mills in the South and liberally purchased stock in companies organized there is another evidence of the South's position.

The various reports of 1907 presented particulars of some extensive and important, both new and enlarging, enterprises, to which brief reference is permissible now. They included the beginning of construction by the West Point (Ga.) Manufacturing Co. for an additional mill of 35,000 spindles, with looms to match, to be operated by electricity generated by the company on the Chattahoochee river; the improvement of 300 acres of land as a mill town, including 200 operatives' cottages, etc.; approximately $800,000 is the entire expenditure planned. Another is the Longhurst Cotton Mills near Roxboro, N. C., this plant to have 10,000 spindles manufacturing fine yarns, and to be electrically equipped; its cost is about $250,000, and production will probably begin this month; this plant is owned by the Roxboro Cotton Mills, an established and successful enterprise. Another is the McAden Mills' enlargement at McAdensville, N. C.; this is a $300,000 investment; it comprises an additional yarn mill of 10,000 spindles, installation of several thousand spindles in old mill, erection of electric power plant and construction of office and library buildings, etc. Another is the Seminole Manufacturing Co., which is installing 20,000 spindles and looms to match at Clearwater, S. C., and means nearly a $500,000 investment. Another is the Lockhart (S. C.) Mills' completion of its No. 2 plant, containing about 25,000 spindles and 800 looms, together with power additions for 3000 horse-power, which is generated by water flow; these are accompanied by complementary betterment work; this about doubles the company's previous equipment, thus giving it 51,000 spindles and 1600 looms, and bringing its investment up to $1,500,000; there is power now available for increasing to 75,000 spindles and 2500 looms. Another big enlargement is seen in the Proximity Manufacturing Co.'s activities at Greensboro, N. C.; these comprise building a 20,000-spindle addition with looms to suit and adding several hundred looms to the White Oak Mills, giving the latter its originally-planned complement of 2000 spindles; these increases give the company more than 100,000 spindles; electricity is the motive power; about $500,000 is the cost of the improvements. Then there is the Long Island (N. C.) Cotton Mills' plan to add 3000 spindles to present plant, build a 10,000-spindle mill at Buffalo Shoals, N. C., and erect a $30,000 electric power plant at the shoals; an increase of capital from $50,000 to $200,000 has been provided for this work. Again, there is a 5000-spindle mill in North Carolina which the owners, who are Philadelphia (Pa.) parties, are doubling at a cost of probably nearly $100,000. Still another project is that of mill men in the Carolinas, who are forming a $200,000 corporation to build at Charleston, S. C., a mill for manufacturing wadding, rope and other products from the waste of yarn and cloth mills, those in the two States being understood to be capable of supplying over 50,000,000 pounds of material per annum. Yet another project, not in such form, however, to be considered absolutely ensured, is the plan of Northern and Southern people for establishing a 100,000-spindle and 3500-loom plant near Chattanooga, Tenn.

There are several other enterprises which, while not in themselves classified as cotton mills, are of a textile nature and are worthy of mention. They are the Chatham Manufacturing Co.'s $150,000 woolen-blanket mill, now building at Winston-Salem, N. C.; the big bleachery being erected at Chickamauga, Ga., by the Crystal Springs Bleachery Co., a $500,000 corporation, and the Skyland Hosiery Co., a $150,000 company, now building at Flat Rock, N. C., a mill of 200 knitting machines with a daily output of 1000 dozen pairs of men's fine hosiery.

The tabulated list below states the title, location and equipment of the companies announced as organized and the established companies deciding to enlarge, during October, November and December, 1907:

Name.	Location.	Spindles.	Looms.
Alabama.			
The Rope & Yarn Mills (rebuild after fire)	Samantha	....	....
*Alabama Cotton Mills	Speigner	3,300	50
Sylacauga Cotton Mills	Sylacauga	.....	....
		3,300	50
Georgia.			
Shingler Cotton Mills	Ashburn	10,000	300
Ball Ground Cotton Mills	Ball Ground	10,000	300
Echota Cotton Mills	Calhoun	10,000	300
Lois Cotton Mills	Douglasville	20,000	500
Cherokee Mills	Griffin	10,000	350
C. W. Moore	Junction City	.....	....
Silver Creek Milling Co.	Rome	.....	....
*Jno. E. Smith Cotton Mfg. Co.	Thomson	6,000	200
		66,000	1950
Louisiana.			
Kohlman Moss & Cotton Felt Mfg. Co.	New Orleans	.....	....
Missouri.			
*Kansas City Cotton Mills	Kansas City	5,000	....
North Carolina.			
Majestic Mfg. Co.	Belmont	10,000	....
Sargent Cotton Mfg. Co.	Charlotte	5,000	....
*Franklin Cotton Mills	Concord	7,000	....
Denton Cotton Mill Co.	Denton	5,000	....
F. M. Pickett	High Point	.....	....
Caswell Cotton Mill	Kinston	.....	....
*Rosemary Mfg. Co.	Roanoke Rapids	5,000	104
Ella Mfg. Co.	Shelby	5,000	126
		37,000	230
South Carolina.			
Blacksburg Mills	Blacksburg	.....	....
Cheraw Cotton Mills	Cheraw	10,000	300
Carolina Waste Mill	Charleston	.....	....
Greeleyville Cotton Mills	Greeleyville	.....	....
*Manetta Mills	Lando	.....	....
Highland Cotton Mills	Newberry	.....	....
Mishna Cotton Mills	Union	15,000	450
		25,000	750
Total		136,300	2980
Total for first quarter		122,468	....
Total for second quarter		227,736	1190
Total for third quarter		177,877	606
Total for fourth quarter		136,300	2980
Total for year 1907		664,381	4776

*Established mills enlarging.

The Tallapoosa Mills.

The MANUFACTURERS' RECORD is advised of the completion of the two-story brick mill building and the warehouse for the Tallapoosa Mills of Tallapoosa, Ga. This company's organization was detailed last May, and its plans were then announced. At first only 10,000 spindles will be installed, but the capacity is 12,500 spindles for the manufacture of 20s two-ply warps and skeins. Steam will furnish the power, the engine being for 600 horse-power, and all the machinery (both textile and power) has been purchased from A. H. Washburn of Charlotte, N. C. R. C. Bibberstein, also of Charlotte, is the company's architect in charge. Capital stock is $200,000, and A. J. Jackson is president.

Kinston Cotton Mills.

Some time ago the MANUFACTURERS' RECORD referred to the Kinston (N. C.) Cotton Mills as having decided to build an addition and install about 4500 spindles. The mill company has now nearly completed the addition, which is a 45x75-foot structure, two stories high, added to former 78x114-foot building. It is installing 5000 spindles, with power plant complete. This increase will give the company a total of 17,000 spindles on the production of knitting yarns.

The Munford Cotton Mills.

Last September the MANUFACTURERS' RECORD presented details of the organization of the Munford Cotton Mills of Munford, Ala. This new company has since accepted plans and specifications for buildings and begun construction. It will install, as has been stated, 2500 spindles and accompanying equipment for manufacturing hosiery yarns. The machinery was contracted for some time ago. N. C. Camp is president of the company, which is capitalized at $50,000.

Royall Cotton Mills.

The Royall Cotton Mills of Wake Forest, N. C., recently completed the additions previously detailed by the MANUFACTURERS' RECORD. The company's additional structure is three stories high, 80x120 feet, and has been equipped with 4992 ring spindles, 2240 twisting spindles and 17 40-inch cards, etc. This gives the company a total of 16,000 producing spindles, besides 5000 twister spindles and 186 looms.

Will Establish Knitting Mill.

J. P. Ewing of Dillon, S. C., will establish a knitting mill at Fayetteville, N. C. He has purchased a building, which will be enlarged and improved to receive the knitting machinery, which is understood to have been contracted for. Probably electricity will be the motive power, supply to be obtained from the local transmission of the Cape Fear Power Co.

The Carolina Waste Mill.

The Carolina Waste Mill of Charleston, S. C., has been incorporated with a capital stock of $200,000 to build the plant referred to last week. Messrs. A. C. Tobias, Ellison A. Smyth, John A. Law, Jas. D. Hammett and others are the directors. For information address the company, care of Messrs. Miller & Whaley, 35 Broad street, Charleston, S. C.

Textile Notes.

The Columbus (Miss.) Manufacturing Co. will add machinery for the manufacture of cotton twine, daily output to be 1000 pounds. All equipment needed has been purchased.

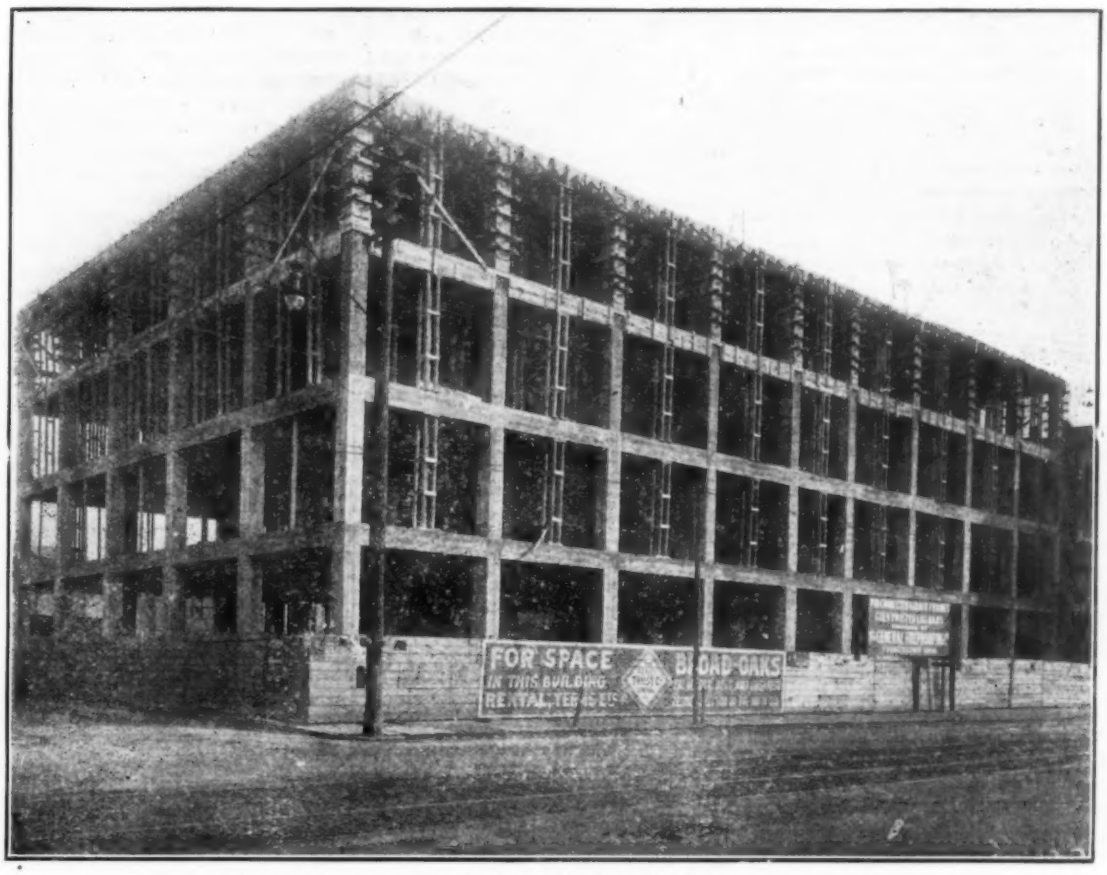
The James Manufacturing Co. of Marion, N. C., has been incorporated with a capital stock of $100,000 by Messrs. J. L. McKay and W. J. McKay of Kings Mountain, N. C., and E. L. McKeown of Guthrie, Okla.

It is stated that the Long Island (N. C.) Cotton Mills is completing arrangements to begin construction of proposed 5000-spindle yarn plant at Buffalo Shoals, N. C., where the company also proposes building water-power electrical plant to develop and transmit 500 horse-power for operating the new mill. Details of the company's plans were announced in the MANUFACTURERS' RECORD last September.

MECHANICAL

A Modern Reinforced Concrete Structure.

The progress of reinforced concrete construction is perhaps better followed by descriptions and illustrations from time to time of buildings constructed under various systems which are steadily being studied and improved to meet varying and changing conditions. A typical structure of reinforced concrete, which represents the methods and system of the General Fireproofing Co. of Youngstown, Ohio, is the Century office building now nearing completion in that city. This building covers an area 100x150 feet, and is designed for eight stories and basement, although for the present but four stories were erected. Altogether approximately 4500 barrels of Atlas Portland cement was used in its construction. The exterior, which will be of white enameled brick and ornamental glazed terra-cotta, was designed by Architects Owsley & Boucherle of Youngstown, Ohio, and the structural work by Herman Laub, structural engineer, of Pittsburg. Charles Connell of Youngstown is the general contractor.



FLOOR CONSTRUCTION IN MODERN REINFORCED-CONCRETE STRUCTURE.

The type of construction is the pure skeleton, the columns being all free standing, as shown in accompanying illustration. The concrete frame (columns, beams, girders and floor slab) was entirely completed before starting the brickwork. The forms for the concrete were all framed up in a lot near the building and were brought to the building site ready for position. Little sawing and less nailing was done on the job, and the usual accumulation of chips and sawdust was left on the vacant lot, thus considerably facilitating the inspection. One peculiar feature of the forms was the use of yokes supported on the sides of the beam boxes, which were put on after the forms were erected. The posts supporting the forms for floors were set up at the intersections of beams and girders, and in the center of beams only. These posts were used in groups of four, thus giving the forms very substantial support, with little bracing required.

The contractor with a good deal of foresight arranged the work so that a complete floor of forms was erected at one time. When this was completed the steel for the entire floor was placed, the reinforcement for beams and girders being "pin-connected girder frames," which are made by the General Fireproofing Co. of Youngstown. These are also clearly shown in one of the accompanying cuts, the special features of advantage of this type of reinforcement being the exact spacing of all reinforcing members and the absolute tie across the columns and beams by means of interlocking links, all the connections being thoroughly bolted or pinned together. The floor-slab reinforcement consisted of five-eighths-inch cold-twisted lug bars at right angles to the beams, spaced with one-quarter-inch lug bars at intervals of two feet in the opposite direction. The slab rods were held up from the forms by means of wire-coil chairs, thus insuring complete imbedment of the steel and the necessary fireproofing. The column reinforcement consisted of vertical rods in sizes from one and seven-eighths inches to one and one-eighth inches, eight rods being used in each column. These were joined about one foot above the floor by means of pipe sleeves. When the column steel had been placed the column concrete was poured. Then the remaining steel for the floor was entirely placed.

When the girder frames and slab steel were in position the concreting of the floor was started. The wheeling of concrete was on plank runways supported on horses about eight inches high. The whole of the concrete for a complete floor, 300 cubic yards, was poured at one time without stopping, the time required being about 16 hours. One gang of men was used, a few extra men being on hand to relieve different ones from time to time.

One of the features of interest was the plant. Two small mixers were used, these being arranged to dump into a hopper which fed into the hoisting bucket. The hoisting bucket, being designed for the purpose, consisted of a simple sheet-iron box with bottom sloping to the front. This box dumped into a hopper at the different floor levels, where the concrete was delivered by two gates to the wheelbarrows. The mixers were thus kept continually at work, and the wheelbarrows were always supplied with concrete at the top. The shape of the hoppers insured the delivery of the concrete in a fresh state to the wheelbarrows, as the V-shaped hoppers acted like a gravity mixer.

The reinforcement is made in such form that no mistakes are liable. The frames are made up in a shop, marked with metal tags and are placed in the forms just as structural steel members of a skeleton building. They are also made with supporting chairs attached, which insures the proper location of the steel in the concrete.

FRAMEWORK OF A MODERN REINFORCED-CONCRETE STRUCTURE.

This type of reinforcement is one of the improved designs in the field of reinforced concrete. The entire structural part of

the work is free from the personal element of the gang of concrete men. It is designed as structural steel has been for years, and built in a shop, just as a lattice girder is made, and thoroughly bolted together in the forms. Each piece is built in the shop to fit its place in the building.

The manufacturer of the "pin-connected girder frame" not only fabricates the steel, but also places it in the forms. By this method the general contractors can construct concrete buildings, as the placing of the concrete is simply concrete work.

In the last six months general contractors have taken up this work, which was always claimed to be a special art with hidden secrets. With the reinforcement handled in this way the architect can inspect the important part of the work, viz., placing the steel, and know that it is all in, and that it is all in to stay. Having done this, his whole time can be given to watching the mix. If the mix is right it is next to impossible to get bad results.

Like all of the scientific arts, reinforced concrete is fast becoming a system of construction, and almost without exception the general contractors have in their work a system of procedure which will need little change to execute reinforced concrete work when the steel is fabricated and placed by the manufacturers.

RAILROADS

[A complete record of all new railroad building in the South will be found in the Construction Department.]

NORFOLK & SOUTHERN.

Southern Railway and Atlantic Coast Line Said to Be After It.

Reports from Norfolk, Va., say that negotiations are in progress looking toward a change of control of the Norfolk & Southern Railway, and the Atlantic Coast Line and the Southern Railway are mentioned as the interests that are seeking the property.

While another report from Norfolk says that no change of ownership of the road is to occur, it is further admitted that the condition of financial affairs in New York may result in a change of the underwriting of the Norfolk & Southern plans, which would cause the entrance of new directors into the company.

Such a change as the latter might mean the incoming of interests identified with either the Southern Railway or the Atlantic Coast Line, or with both.

Since the entrance of Marsden J. Perry and associates into the Norfolk & Southern two or three years ago the progress of the property has been rapid. The same interests acquired lumber companies and lumber railroads in North Carolina and began to carry out extensive plans, in the course of which the Raleigh & Pamlico Sound Railroad, a new line building from Raleigh to the coast, was acquired and completed. An extension was made to Newbern, and other places were also given railroad facilities, the consequence being that various sections of the eastern part of North Carolina were benefited by the advent of transportation facilities. The company has other plans to carry out, one of which is the building of a great bridge about five miles long across Albemarle Sound between Edenton and Mackeys Ferry.

There has been much talk about the future of the Norfolk & Southern from time to time. It has been suggested that the Seaboard Air Line would connect with it and perhaps absorb it. It has also been surmised that it might be connected up with the Georgia & Florida Railway, which is being built by John Skelton Williams and others from Augusta, Ga., to the Gulf of Mexico. The same interests own the Raleigh & Charleston Railroad, a line 41 miles long from Lumberton, N. C., to Marion, S. C., and which could be used for part of a connecting link.

Whatever the outcome of the alleged negotiations, the improvement and extension of the Norfolk & Southern seems to be assured.

Washington to Gettysburg.

Plans to get a railroad from Washington, D. C., to Gettysburg, Pa., are advancing with considerable speed. Following upon the heels of the announcement that a connection would be built between Frederick, Md., and Great Falls to make the through line projected by the Washington, Frederick & Gettysburg Railway comes the organization of the Washington, Westminster & Gettysburg Railroad Co., that proposes to build a road directly north from Washington via Sandy Springs and Westminster, Md., to Gettysburg. This route would be about 75 miles long. Capital in New York, Philadelphia, Pittsburg and other cities is said to be behind the scheme.

The officers of the company are: President, Dr. J. B. Colgrove of Washington; first vice-president, Edwin P. Thomas of Sandy Springs, Md.; second vice-president, A. A. Chapin of Washington; treasurer, Robert N. Harper of Washington; chief engineer, Walter Atlee of Baltimore; directors, Allan Farquhar of Sandy Springs, Md.; Edwin H. Miller of New York; G. H. Birnie and Edwin Reinfellar, both of Taneytown, Md., and T. F. McGlone of Baltimore.

The other line referred to is to be composed of the Great Falls & Old Dominion Railway, running from Washington to Great Falls, and the Washington, Frederick & Gettysburg Railway, which is now building north from Frederick, Md., to Thurmont, Emmittsburg and Gettysburg, about 10 miles being now completed. Survey is in progress for a connection between Great Falls and Frederick, about 30 miles.

Seaboard Air Line's Report.

The annual report of the Seaboard Air Line, covering the fiscal year ended June 30 last, has been issued. It shows gross earnings, $17,204,182; expenses and taxes, $14,103,148; net earnings, $3,101,034. The year before the gross was $15,809,019; expenses and taxes, $11,588,588, and net, $4,211,431. After adding other income amounting to $31,803 and deducting interest and rentals there was shown a deficit of $304,190 this year as compared with a surplus of $1,131,578 the year before.

President Garrett says the condition of roadway, track and structures has been considerably improved at an average of over $845 per mile of line, the total spent for this being $2,205,997. The maintenance of equipment cost $2,314,914, which sum includes $155,000, representing the value of equipment destroyed or retired.

The traffic statistics show: Passengers carried, 3,356,744; passengers carried one mile, 160,299,375; rate per mile, 2.36 cents; tons of freight carried, 6,426,991; tons carried one mile, 1,023,498,330; rate per ton per mile, 1.118 cents. The passenger rate for the year before was 2.382 cents and the freight rate 1.121 cents; all the other figures above quoted display liberal increases, the 1906 report showing passengers carried, 3,049,622; passengers carried one mile, 135,826,000; tons of freight carried, 6,064,558; tons carried one mile, 961,550,000.

Building on Several Lines.

Mr. W. L. Seddon, chief engineer of the Seaboard Air Line, writes the MANUFACTURERS' RECORD from Portsmouth, Va., that the company laid on the Catawba Valley Railway since January 1, 1907, 11.02 miles of track from Spence to Fort Lawn, S. C. It also laid on the Tallahassee, Perry & Southeastern Railway in Florida 8.44 miles of track, making a total of 19.46 miles of completed railway for the past year.

Mr. J. A. Robertson, superintendent of the Randolph & Cumberland Railway Co., writes the MANUFACTURERS' RECORD from Carthage, N. C., saying that the company has graded three and one-half miles of line from Hallison to Tillman, N. C., but work is now stopped, and it cannot be said when it will be resumed.

Mr. W. E. Guild, treasurer, writes from Wiggins, Miss., to the MANUFACTURERS' RECORD that the Finkbine Lumber Co. extended its logging railroad about nine and one-half miles during 1907. The grading, bridges and general construction was standard in every respect. The ties are on the grade ready to receive the rail, which will be put on, and the surfacing will be completed within the next two or three months. The earth work and bridge work are all finished.

New Railroad Plans.

Among the new railroad plans recently incorporated are the following:

The Oklahoma Southern Railway Co., with headquarters at Eldorado, Okla., and capital of $7,000,000, which proposes to build from the intersection of Grayson county, Texas, with the Red river to the western line of Greer county, a distance of 250 miles. The incorporators are H. W. Morris and C. B. Hollman, Eldorado; W. G. Crowder, L. Simpson and M. M. Hawkins, Quanah, Texas.

The Farmers & Merchants' Railway Co., capital $6,000,000, has also been chartered by H. W. Morris and associates as above to build from the north line of Hardeman county, Texas, to the north line of Harper county, Okla., 200 miles.

The Oklahoma Mineral Belt Railway Co., capital $10,000,000 and heaquarters at Roosevelt, Okla., proposes to build a line from Memphis, Texas, to Mt. Hope, Ark., going through 12 counties in Oklahoma and with a branch from a point in Kiowa county to El Reno and from Tatums to Ardmore; estimated cost $14,000,000. The directors are E. E. Williams of Hobart, Okla.; B. M. Berry, John Berry, Henry Berry, G. E. Sewell and Fred McGillison of Roosevelt, Okla.

The Port O'Connor Line.

Mr. L. A. Gueringer, chief engineer of the Port O'Connor, Rio Grande & Northern Railway, Victoria, Texas, writes the MANUFACTURERS' RECORD that the company has repaired and put in first-class shape the grade between Port O'Connor and Yoakum, Texas, a distance of 90 miles. It is expected to lay track on this between the above points commencing in January. It is also expected to begin construction from Yoakum north to Smithville and San Antonio early in 1908. W. I. Allen is vice-president and general manager of the company, also at Victoria.

The route of this road, as shown by an official blueprint, is from Port O'Connor, on Matagorda bay, via Victoria and Yoakum to Gonzales, Texas, where it branches, one line going north to Smithville and the other (which is the longer of the two) west via Seguin to San Antonio, Texas.

Progress on Galveston Terminals.

The Galveston Terminal Railway Co., which is engaged in building extensive terminals at Galveston, Texas, has nearly completed its new freight depot at the corner of Strand and 29th street. The office section of the building is of yellow pressed brick, and part (46x100 feet) is two stories high. The rest is one story high, and the total dimensions are 46x300 feet. The platform is of brick and concrete. This structure, when finished, will have cost about $100,000.

The terminal company has also been laying much trackage, and is doing extensive work in the way of filling in lowlands for its uses. About $1,000,000 has, it is said, already been expended.

Ballinger & Abilene.

Mr. C. A. Doose, president, writes from Ballinger, Texas, to the MANUFACTURERS' RECORD confirming the report that the Ballinger & Abilene Railroad Co. has been chartered to build its projected line from Ballinger to Abilene, Texas, 53 miles. The capital is $200,000, and the principal offices will be at Ballinger.

The officers of the company are C. A. Doose, president; John I. Guion, first; J. W. Powell, second, and Tom Ward, third vice-president; J. McGregor, secretary; Jo Wilmeth, treasurer; W. J. McDaniel, chief engineer and general manager; C. O. Harris, general attorney.

New Orleans, Mobile & Chicago.

A dispatch from Mobile, Ala., says that official confirmation has been made of the report that the Mobile, Jackson & Kansas City Railroad will be taken over by a new company, the New Orleans, Mobile & Chicago Railroad Co., organized with a capital of $60,000,000, and the line will be extended, as reported last week in the MANUFACTURERS' RECORD, the extensions proposed being north to the Ohio river and southwest to New Orleans. An official is reported as saying that the latter will hardly be accomplished before two years have elapsed.

Trinity County Lumber Line.

Mr. P. A. McCarthy, chief engineer, writes from Groveton, Texas, to the MANUFACTURERS' RECORD that the grading on the steam railroad of the Trinity County Lumber Co. is nearly completed between Groveton and Blix, 23 miles, and one mile of track has been laid out of the latter place. The line will be completed by March 1. From Blix to Lufkin, 13 miles, the track of the Texas Southeastern Railroad will be used.

Pushing On to Birmingham.

The Atlanta, Birmingham & Atlantic Railway Co., which recently completed its Birmingham extension as far as Talladega, Ala., has begun operating trains to and from there. Talladega is 77 miles from Birmingham and 422 miles from Brunswick, Ga. Construction is being pushed between Talladega and Birmingham to complete that section as soon as possible.

Railroad Notes.

Mr. E. G. Courtney, according to an official circular, has been appointed master mechanic of the Arkansas, Louisiana & Gulf Railway, with headquarters at Monroe, La.

The freight traffic department of the Norfolk & Western Railway has issued a little circular entitled "The Season's Greeting," which was distributed during the Christmas holidays. It is neatly prepared and contains a list of the freight officials.

The Illinois Central Railroad has issued an attractive folder about its service to Cuba via New Orleans, in connection with the Southern Pacific Steamship Line, which conveys passengers direct to Havana. The folder is handsomely printed and beautifully illustrated with interesting pictures of scenes in the Cuban capital and at other points on the island. One of the best illustrations is a bird's-eye view of Havana and its extensive harbor.

The Cotton Manufacturers Association of South Carolina will meet at Columbia on January 3.

Construction Department

TO OUR READERS!

In order to understand and follow up properly the Construction Department items, please bear in mind the following statements:

EXPLANATORY

The MANUFACTURERS' RECORD seeks to verify every item reported in its Construction Department by a full investigation and complete correspondence with everyone interested. But it is often impossible to do this before the item must be printed, or else lose its value as news. In such cases the statements are always made as "rumored" or "reported," and not as positive items of news. If our readers will note these points they will see the necessity of the discrimination, and they will avoid accepting as a certainty matters that we explicitly state are "reports" or "rumors" only. We are always glad to have our attention called to any errors that may occur.

In correspondence relating to matters reported in this paper, it will be of advantage to all concerned if it is stated that the information was gained from the MANUFACTURERS' RECORD.

ADDRESS FULLY

To insure prompt delivery of communications about items reported in these columns, the name of one or more incorporators of a newly incorporated enterprise should be shown on the letter addressed to that town, or to the town of the individual sought, as may be shown in the item, as sometimes a communication merely addressed in the corporate or official name of a newly established company or enterprise cannot be delivered by the postmaster. This will help to insure prompt delivery of your communication, although it is inevitable that some failures on the part of the postal authorities to deliver mail to new concerns will occur.

WRITE DIRECTLY

It is suggested to advertisers and readers that in communicating with individuals and firms reported in these columns, a letter written specifically about the matter reported is likely to receive quicker and surer attention than a mere circular.

BRIDGES, CULVERTS, VIADUCTS

Alexandria, La.—Police Jury of Rapides parish will award contract January 16 for construction of steel bridge on concrete piers across Bayou Rapides, mentioned in October; Ira W. Sylvester, consulting engineer, Rapides Bank Building. (See "Machinery Wanted.")

Baltimore, Md.—Baltimore Ferro-Concrete Co., Glenn Building, 16 St. Paul street, was lowest bidder at its bid of $179,516 for construction of concrete bridge on Edmondson avenue over Gwynn's falls. Structure is to be 60 feet wide and 430 feet long, with three arches. It will be monolithic in construction, with reinforced concrete roadway. Work will be done under supervision of B. T. Fendall, City Engineer, City Hall. (Previously reported.)

Blanchland, W. Va.—Guyan Bridge Co., recently reported incorporated, will build bridge across Guyandotte river at Branchland; cost $20,000; president, Alexander M. Parsons; vice-president, C. H. Miller; secretary-treasurer, Rufus Switzer.

Jefferson City, Mo.—Williamsville, Greenville & St. Louis Railway, C. H. Smalley, president, St. Louis, Mo., will construct bridge across the St. Francis river.

Nashville, Tenn.—Cumberland River Bridge Committee of Davidson county, Cole Building, will award contract January 22 for steel bridge work; J. K. Rains, chairman; H. M. Jones, engineer. (See "Machinery Wanted.")

Old Monroe, Mo.—St. Charles and Lincoln counties will construct proposed steel bridge at cost of about $8000; main span, 198 feet long, to rest on tubular piers; two 18-foot approaches, resting on steel legs, with concrete backing; bids will be received at Troy, Lincoln county, until February 13. Address County Commissioners. (See "Machinery Wanted.")

CLAYWORKING PLANTS

Carrollton, Texas.—Brick Plant.—R. L. Ingram will establish plant to manufacture building brick, pacing brick, etc.

Carrollton, Texas.—Brick Plant.—Reported that the Carrollton Brick Manufacturing Co. contemplates doubling capacity of plant.

Charleston, W. Va.—Kanawha Brick & Tile Co., recently reported incorporated, will establish plant for the manufacture of fine face brick, fire-brick and ornamental tile; buildings will be erected and machinery installed at cost of $25,000 to $30,000; J. W. Jenkins, president and manager; A. E. Wood, engineer in charge.

Hot Springs, Ark.—Pottery.—Lee Worthington of Hot Springs and John Brown, Chicago, Ill., contemplate establishing pottery in Hot Springs. Company will probably be organized. (See item under "Mining.")

COAL MINES AND COKE OVENS

Beckley, W. Va.—E. E. White Coal Co. incorporated with $500,000 capital stock by E. E. White, Veris Austen, F. M. Richter, R. F. Barthe and J. A. Vaught, all of Mount Carmel, Pa.; T. E. Snyder, Wilburton, Pa.; J. M. Humphrey and A. C. Stahl, both of Centralia, Pa., and others.

Fort Smith, Ark.—Blocker Coal & Land Co. incorporated with $100,000 capital stock by T. L. Wright, W. F. Blocker, A. N. Sicard, O. E. Carnes and others.

Friendsville, Md.—Reported that the Western Maryland Coal & Coke Co. has purchased entire holdings of Penn-Garrett Coal Co. at Friendsville and will soon begin operations. Former company was recently reported incorporated with $100,000 capital stock by H. S. Byrne, N. F. Sauer and E. D. York, all of New York.

Jefferson County, Ala.—Tennessee Coal, Iron & Railroad Co. has completed construction on its coal mine No. 12; equipped with steel head frame, skip hoists and jig coal washer; daily capacity of 2500 tons. Birmingham Southern Railroad is being extended to the mine. General offices of Tennessee Company at Birmingham, Ala.; New York offices at 115 Broadway.

Jellico, Tenn.—Pace Coal Co., recently reported incorporated under Jacksboro, will act as sales agent for 10 mining companies. T. T. Pace is president and manager, R. B. Baird vice-president and J. T. Bradley secretary-treasurer.

Logan, W. Va.—E. R. Johnson Coal Mining Co., recently reported incorporated with $250,000 capital stock, will develop about 1600 acres of leased coal land on Crooked creek, near Logan; expects to begin operation January 15; capacity of plant, 1500 tons per day; president, E. R. Johnson, Roanoke, Va.; vice-president, Edw. L. Stone, Roanoke, Va.; secretary and treasurer to be elected; manager, J. B. Hudson; main office, Roanoke, Va.

Middlesboro, Ky.—Lignite Coal Co. organized with $100,000 capital stock by J. G. Fitzpatrick, Joe F. Bosworth, E. S. Helburn and A. H. Rennebaum, all of Middlesboro; George Beach, A. E. Radkin, John Hoffman and W. E. Gunn, all of Covington, Ky. Company has leased 1300 acres of coal lands on Stony fork, near Middlesboro, and will install two coal operations on the property. It is understood that three miles of railroad will be constructed to the Louisville & Nashville Railroad.

Middlesboro, Ky.—A. P. Seligman and John Turnback, both of Mahoney City, Pa.; S. G. Seligman, M. Girber and J. Finley, all of Tamaqua, Pa., have purchased Chenoa Coal & Coke Co. Property consists of mining plant and 640 acres of coal land; it is understood purchasers will increase plant. (S. S. Seligman of Mahoney City, Pa., and associates recently mentioned as having purchased the property.)

Montana, W. Va.—Pittsburg Coal Co. of Fairmont, W. Va., reported last week as to incorporate with a capital stock of $25,000 to develop 26 acres of coal lands and to acquire 100 acres additional, will install plant to cost about $50,000 and have daily capacity of 500 tons. Company will also construct coke ovens, but has not determined how many. It has a nine-foot Pittsburg vein of coal, and expects to begin operations by March 1, 1908; W. D. McGinnis, president and treasurer, and J. R. Bailey, secretary; George Porter, Uniontown, Pa., constructing engineer.

Wheeling, W. Va.—Kendalia Coal & Coke Co., reported incorporated last week with $100,000 capital stock, will develop 1500 acres of land in Kanawha county; daily capacity of mines to be 2000 tons of coal; plant to cost $150,000; E. L. Perkins, president; A. S. Bell, vice-president and general manager; E. G. Perkins, secretary, and A. H. Werder, treasurer; A. S. Bell, engineer in charge; offices in City Bank Building.

CONCRETE AND CEMENT PLANTS

Brunswick, Ga.—Granite Stone Co. of Hazlehurst, Ga., will establish branch plant recently mentioned; will manufacture cement tile, vases, hitching posts, blocks, etc.; machinery purchased; W. T. Christopher, manager. (See "Machinery Wanted.")

Kent County, Texas.—John A. Wyshard of Nebraska, H. J. Budd, Knoxville, Iowa; A. J. Van Allstine, Omaha, Neb., and R. C. Lomax of Fort Worth, Texas, are interested in the development of 150,000 acres of cement lands in Kent county and contemplate establishing large cement plant which will probably cost about $1,000,000. Pony plant is now in operation and about 160 sacks of cement are daily prepared for market.

ELECTRIC-LIGHT AND POWER PLANTS

Blacksburg, Va.—Blacksburg Power & Supply Co. will install electric-light plant.

Buffalo Shoals (not a postoffice), N. C.—Long Island Cotton Mills is understood to be completing arrangements for beginning construction of proposed water-power electrical plant, to develop and transmit 500 horse-power for operation of cotton mill to be built; power plant estimated to cost $20,000; Osborne Brown of Long Island, N. C., president; Geo. H. Brown of Statesville, N. C., treasurer. (Previously detailed.)

Easton, Md.—City will consider propositions for granting franchise for light, heat and power plant and contract for lighting city streets; Martin M. Higgins, Mayor.

Elba, Ala.—Pea River Water-Power Co. is understood to be planning the development of water-power at Elba, at the junction of Pea river and White Water. It is sid that power will be furnished to manufacturing plants and for operation of electrical railways.

Gorman, Texas.—Gorman Light & Power Co., recently reported incorporated, will expend $15,000 in erection of building and installation of machinery; building to be of wood, 60x80 feet; capacity of dynamos, 16,000 candle-power equivalents; J. R. Barclay, engineer in charge; F. B. Winters, manager; W. A. Waldrop, secretary and treasurer.

Headland, Ala.—City has voted $23,500 of bonds for construction of electric plant and water-works. Address The Mayor. (Recently mentioned)

Jefferson City, Tenn.—Jefferson City Electric Co. contemplates constructiong a street arc-lighting system and installing compound engine and three-phase direct-current generator to furnish power for woolen mill.

Knoxville, Tenn.—Wilkerson & Boyce, Asheville, N. C., are reported as proceeding with arrangements for proposed development of water-power on the French Broad river and the transmission of electrical energy to Knoxville. It is planned to build a 15-foot dam on the river. About 4500 acres of land have been secured and other property is being optioned. It is rumored that $2,000,000 is available for the work. Roland A. Thayer of Lockwood, Greene & Co., Boston, Mass., is said to be financially interested.

Little Rock, Ark.—Municipal Electric Co. has applied for 50-year franchise to furnish light, heat and power; agrees to build plant and furnish city with 350 arc street lights of not less than 550-kilowatt power. Company has not yet organized, but is represented by Atwood Benton, Kansas City, Mo.

Meadville, Miss.—Meadville Light & Power Co. incorporated to build light and power plant; capital $10,000; capacity 50 kilowatts; to be in operation by April 1. Henderson Improvement Co., Henderson, Tenn., has contract for installation. D. L. Rush is general manager, secretary and engineer in charge. Frame building, 35x60 feet, will be erected and equipped at cost of $5000. Until February 1 secretary should be addressed at Henderson, Tenn. (See "Machinery Wanted.")

Morehead, Ky.—City will construct electric-light plant at a cost of about $10,000. Reliance Engineering Co., Fourth National Bank Building, Cincinnati, Ohio, will prepare plans.

Sallisaw, Okla.—Southwestern Light & Power Co., recently reported incorporated, will erect power-house; president, W. A. Loudon; secretary, W. W. Ray.

FOUNDRY AND MACHINE PLANTS

Ardmore, Okla.—Gasoline Engines, etc.—Reported that a New York company manufacturing gasoline engines, steam injectors, etc., is communicating with Dr. F. W. Broadway relative to establishment of plant in Ardmore.

Chattanooga, Tenn.—Car Couplers.—Safety Car Coupler Co. incorporated with $100,000 capital stock by A. W. Boyd, John Shamotulski, M. A. Brown and others to manufacture a safety car coupler patented by D. J. Sauls.

Columbus, Ga.—Desk Hardware.—Standard School Desk Manufacturing Co., M. O. Berry, president, expects to build large foundry. Architects are preparing plans; automatic sprinklers to be included. (See item under "Woodworking Plants.")

Elm Grove, W. Va.—Foundry, etc.—Gonder & Birch Company incorporated with capital stock of $10,000 by William Birch, William Gonder and George Leinweber to operate foundry and machine shop; buildings and machinery to cost $10,000; erroneously reported lately. (See "Machinery Wanted.")

Eufaula, Ala.—Roller Covering.—St. Elmo Roller Covering Shop has been established; 18x32-foot building occupied; gasoline power. W. A. Cargill, Box 365, is manager. (Lately mentioned.)

Greensboro, N. C.—Motor Cars.—Carolina Motor Co. incorporated with $10,000 capital stock by L. A. Folger, G. W. Painter, A. R. Perkins and T. T. Andrews to manufacture and deal in motor cars.

Middleburg, Va.—Machinery.—Williams Fuel Saving Power Co. incorporated with $5,000,000 capital stock to manufacture all kinds of machinery; W. D. Williams, president, and John Binns, secretary-treasurer, both of Philadelphia, Pa.

New Orleans, La.—Electrical Appliances, etc.—Electric Manufacturing Co. incorporated with $25,000 capital stock to manufacture and deal in electrical, mechanical, compressed-air and gas appliances, tools, machines and other equipment; conduct general manufacturing and repair enterprise; operate and construct steam, electric or other power plants, etc.; George W. Logan, president; Warren B. Reed, vice-president, and Edward S. D. Logan, secretary-treasurer.

Richmond, Va.—Typewriters.—Royal Typewriter Co. incorporated with Lewis McCall, president, Englewood, N. J.; L. V. McLone, vice-president, New York, N. Y., and C. M. Burlingame, secretary-treasurer, Brooklyn, N. Y.

St. Louis, Mo.—Shoe Machinery.—Manufacturers' Supplies Co. incorporated with $15,000 capital stock to manufacture and deal in shoe machinery by Frank M. Starboard, E. F. Spalsbury, E. W. Thayer and others.

St. Louis, Mo.—Automobiles, etc.—Ross Motor Vehicle Co. incorporated with $75,000 capital stock by Augustus Ross, Thomas A. Bell, Frank D. Gildersleeve and others to manufacture and deal in automobiles, motor vehicles, etc.

St. Louis, Mo.—Auto Springs and Supplies. Universal Auto Spring Co. incorporated with $110,000 capital stock to manufacture and deal in auto springs and supplies by Frank G. Koehler, William Klasing, Henry Schwarting and others.

ICE AND COLD-STORAGE PLANTS

Wesson, Miss.—Wesson Light & Power Co. will install ice plant with daily capacity of five tons. (See "Machinery Wanted.")

LUMBER-MANUFACTURING PLANTS

Atlanta, Ga.—Evans Lumber Co. incorporated with $25,000 capital stock by N. F. Evans of Atlanta, W. F. Morris, Maysville, Ga.; R. W. Smith and James Evans, both of Gainesville, Ga., and others.

Baton Rouge, La.—Bayou Rouge Lumber Co. incorporated with $10,000 capital stock; L. B. Dennis, president; E. E. Ringer, vice-president, and J. B. Crawford, secretary-treasurer.

Bristol, Va.-Tenn.—J. A. Wilkinson will install two 150-horse-power boilers in band mill.

Brunswick, Ga.—L. B. McEwen and Karl Fries have purchased Barker & McDonald shingle mill and are incorporating the Brunswick Shingle Co. to operate the plant; will rebuild and increase capacity; daily output to be 75,000 cypress shingles; all machinery bought; capital stock, $5000.

Floresville, Texas.—J. D. Wood will establish saw-mill to develop cottonwood timber.

Jacksboro, Texas.—D. R. Sewell Lumber Co. incorporated with $10,000 capital stock by D. R. Sewell, P. B. Cox and J. W. Wells.

Little Rock, Ark.—D. A. Chapin and Voorhees, both of Pocahontas, Ark., contemplate building planing mill in Little Rock.

Louisville, Ky.—E. B. Norman & Co., recently reported incorporated with $55,000 capital stock to operate sawmill, has purchased plant and yards of Ohio River Sawmill Co. E. B. Norman is president and treasurer of the new company and R. Carnahan of Oneida, Ky., is vice-president and secretary.

Moberly, Mo.—Moberly Planing Mill Co. will erect factory building; two stories; brick, stone and steel; electric lighting; cost $8000.

Moberly, Mo.—W. E. Swindell will erect one-story brick sawmill at a cost of $6000.

Newbern, N. C.—Union Point Lumber Co. is actively preparing to rebuild its plant, recently burned. (See "Machinery Wanted.")

Mansfield, Ark.—Mobley & Brock will install planing mill.

Parkersburg, W. Va.—Parkersburg Mill Co. will rebuild plant recently reported burned at a loss of $100,000.

Pickens, W. Va.—Mayton Lumber Co. incorporated with $50,000 capital stock by Henry Spies of Pickens, J. H. Brewster and M. B. Sprigg, both of Weston, W. Va., and others.

Orange, Texas.—Key Lumber Co., recently noted to have purchased sawmill and timber lands near Orange, will erect buildings and install machinery at cost of about $18,000; capacity about 30,000 feet daily yellow pine lumber; manager, J. D. Key.

Rio (not a P. O.), La.—Bassfield Lumber Co., Hattiesburg, Miss., recently incorporated with $10,000 capital stock by D. J. Sutherland and E. A. Hyde, is reported to build sawmill at Rio with daily capacity of 35,000 to 50,000 feet of lumber.

Sunflower County, Miss.—E. N. Case & Sons, Dothan, W. Va., recently noted to have purchased timber land for development, will erect band mill with daily capacity of 30,000 to 40,000 feet lumber; as previously stated, about seven miles of steel railroad will be built; other plans not fully matured.

Tylertown, Miss.—Tylertown Lumber Manufacturing Co. incorporated with $20,000 capital stock.

MINING

Center, Texas.—Coal and Ochre.—John McLendon will organize Lick Creek Development Co. to develop red and yellow ochre deposits on 5000 acres of leased land; latter has also bituminous coal deposits, which may be mined.

Ellijay, Ga.—Marble.—King Marble Co. incorporated with $1,000,000 capital stock and privilege of increasing to $5,000,000 to quarry and finish marble and other stone, etc., by Wilmer C. King, James P. Gay, Wm. K. Evans, Ella E. King and others, all of Detroit, Mich.

Hot Springs, Ark.—Clay and Copper.—Lee Worthington of Hot Springs and John Brown, Chicago, Ill., contemplate the development of about 400 acres of clay property eight miles from Hot Springs. Demonstration plant has been built in Hot Springs, where art ware, terra-cotta, bathtub and lavatory ware, brick, tiling, etc., are manufactured. Company will probably be organized to mine the clay and establish pottery in Hot Springs. Messrs. Worthington & Brown also contemplate the further development of copper deposits at Cedar Glades, about 15 miles from Hot Springs, recently mentioned. Latter property also contains gold and silver.

Joplin, Mo.—Concentrating.—Chitwood Concentrating Co. incorporated with $7500 capital stock by E. A. Elliott, W. Hunter and Arthur Shannon.

Polk County, Ark.—Slate.—American Slate Co. is being organized with $200,000 capital stock to quarry slate in Polk county, Arkansas; W. E. Hardy, Rosedale, Kan., president; F. S. Glidden of the East Side, Kansas City, Mo., vice-president; B. M. Barnett, Rosedale, Kan., treasurer, and M. J. Harring of the East Side, Kansas City, Mo., secretary.

Prince William County, Va.—Pyrites.—Babin Branch Mining Co., recently reported incorporated with $300,000 capital stock, has purchased property in Prince William county and will develop pyrites mines; P. B. Bradley, president, Boston, Mass., and J. U. Detrick, vice-president, 808 Maryland Trust Building, Baltimore, Md.

MISCELLANEOUS CONSTRUCTION WORK

Cape Charles, Va.—Dredging.—Contract will be awarded January 29 at Engineer's Office, U. S. Army, Custom-house, Norfolk, Va., for dredging harbor at Cape Charles; Joseph E. Kuhn, Major Engineers. (See "Machinery Wanted.")

Kansas City, Mo.—Retaining Wall.—American Linseed Co. has awarded contract to Urban Construction Co., Dwight Building, for construction of reinforced concrete retaining wall, to cost about $7000.

Greenwood, Miss.—Drainage Commissioners of Leflore county will construct several miles of drains, involving removal of about 240,000 cubic yards of dirt; contract will be awarded; recently mentioned. (See "Machinery Wanted.")

Lafourche Parish, La.—Land Reclamation.—Louisiana Alluvial Lands Co. incorporated with $100,000 capital stock; company proposes to drain 50,000 acres of land in Lafourche parish, investing about $1,000,000; also property in the Bayou Bleu district; land will be colonized and used for farming purposes after it is reclaimed. E. W. Wickey, New Orleans, La., is president, and John M. Stahl, Quincy, Ill., is interested.

New Iberia, La.—Drainage.—Bayou Choupique section of Iberia parish has voted a three-mill tax for drainage. Address County Commissioners.

New Orleans, La.—Levee Construction.—Levee Board will open bids January 7 for construction of Arlington levee, containing about 125,000 cubic yards, and the Cairo levee in Caddo parish, along the Red river, estimated to contain about 15,000 cubic yards; Frank M. Kerr, chief State engineer; Col. Sidney E. Lewis, assistant State engineer.

New Orleans, La.—Land Reclamation.—Abundance Planting Co. incorporated with $16,000 capital stock to reclaim swamp lands, etc., by George E. Cuther, Charles H. Eckels, Edwin DeLeon and A. B. Groves.

St. Petersburg, Fla.—Channel Improvements.—City voted December 31 on issuance of $9000 of bonds for deepening and improving present channel leading to bay. Address The Mayor.

Wheeling, W. Va.—Guide Walls, etc.—Contract will be awarded January 25 at U. S. Engineer Office, Wheeling, W. Va., for constructing guide walls, grading, paving, etc., at dam No. 13, Ohio river; F. C. Boggs, Captain, Engineers. (See "Machinery Wanted.")

MISCELLANEOUS ENTERPRISES

Amity, N. C.—Telephone System.—Amity Telephone Co., lately noted incorporated, has organized with C. R. Goodman secretary-treasurer and J. T. Goodman manager. Address, R. F. D. No. 2, Box 60, Mt. Ulla, N. C. (See "Machinery Wanted.")

Baltimore, Md.—Printing Plant.—Simpson & Doeller Co., printers, Milton avenue, Lanvale and Port streets, has increased its capital stock from $25,000 to $250,000. The company will erect large building for its plant, which is to be enlarged.

Baltimore, Md.—Railway Supplies.—Maryland Railway Supply Co., 511 Continental Building, incorporated with capital stock of $30,000 to develop patented invention and deal in railway supplies by Nelson T. Perin, T. Edward Hambleton, Jr., Thomas D. Claiborne, Thomas W. Boykin and T. Rowland Slingluff.

Baltimore, Md.—Mantels and Tiles.—Gahr Mantel Co., 313 West Madison street., incorporated with capital stock of $10,000 to deal in mantels and tiles by Carroll J. Dunn, John J. Kelley, William J. Harker, H. A. Steiner and C. P. Kakel.

Beaumont, Texas.—Oil Wells.—Cork Oil Co. incorporated with $4800 capital stock by Oscar Johnson, A. C. Neaghern, H. A. Fleming and others.

Big Stone Gap, Va.—Steam Laundry.—Royal Laundry Co. incorporated with $10,000 capital stock; J. B. Ayers, president, and W. R. Jessee, secretary-treasurer.

Birmingham, Ala.—Land Improvement.—Tidewater Land Co., recently reported incorporated with $200,000 capital stock, has elected R. H. Little, Tuscaloosa, Ala., president, Lewis Minor treasurer and R. D. Johnston, Jr., secretary, both of Birmingham. Company has increased capital stock to $500,000.

Charlotte, N. C.—Plumbing.—Hackney Bros. Co. incorporated with $100,000 capital stock by L. L., J. P., S. H. and W. R. Hackney.

Cleveland, Okla.—Oil Wells.—Oklahoma State Oil Co. incorporated with $250,000 capital stock by E. F. Cremin, W. H. Roeser and William Roeser, Jr.

Crowley, La.—Oil Wells.—Carenco Oil Co. (J. T. Toler, president), recently noted to incorporate for the development of 700 acres of oil land in Anse-la-Butte field, will commence drilling within next 30 days; capital stock is $100,000. (See "Machinery Wanted.")

Crystal Springs, Miss.—Land Improvement.—Gatesville Realty Co., recently reported incorporated, contemplates development of business town on line of New Orleans & Great Northern Railroad; president, A. Lotterhos; vice-president, J. W. Grantham; secretary and treasurer, C. Huber; company will erect cement building, 50x100 feet. (See "Machinery Wanted.")

Guthrie, Okla.—Construction.—Manhattan Construction Co. incorporated with $100,000 capital stock by John R. Kimball, Edwin B. Cosby and Harry H. Spurlock.

Harrisonburg, Va.—Machinery.—W. E. Swank will establish transfer machine house, deal in all kinds of farming implements, wagons, etc.; site 150x40 feet has been purchased, on which a three-story building, constructed either of cement block or composition gray stone, will be erected. About $10,000 will be expended.

Hattiesburg, Miss.—Magruder & Co. incorporated with $50,000 capital stock by R. A. Magruder, H. L. Eckles and others.

Jackson, Miss.—Telephone System.—N. D. Smith and others are organizing company with $250,000 capital stock to construct telephone system.

Jennings, La.—Oil Wells.—Charles B. Hill Oil Co. incorporated with $50,000 capital stock; Charles D. Hill, president; E. A. Helm, vice-president, and S. F. B. Hill, secretary-treasurer.

Kansas City, Mo.—Music Company.—Automatic Music Co. incorporated with $40,000 capital stock by C. D. Rule, C. E. Harmonson, A. F. Roby and others.

Kansas City, Mo.—Printing Plant.—Franklin Hudson Publishing Co., Franklin Hudson, president, has had plans prepared by J. Oliver Hogg for erection of building 142x266 feet; three stories in front and one story in rear; roof of "saw-tooth" design; cost, $65,000; contract has been awarded; present location, 1014 Wyandotte street.

Kerrville, Texas.—Telephone System.—Kerrville Telephone Co. incorporated with $30,000 capital stock by D. H. Comparette, A. C. Schreiner, J. W. Taylor, G. R. Gay and others to construct telephone system through Kerr, Bandera, Gillespie, Edwards and Mason counties.

Knoxville, Tenn.—Amusement Company.—Columbia Amusement Co. incorporated with $25,000 capital stock by J. W. Prevost, J. J. Price, B. F. Orr and others.

Knoxville, Tenn.—John M. Allen Co. incorporated with $50,000 capital stock by J. M. Allen, Walter Bell, Hugh McCamum and others.

Keyser, W. Va.—Oil and Gas Wells.—Ludlow Oil & Gas Co. incorporated with $5000 capital stock by F. H. Babb and E. E. Springer, both of Keystone, W. Va.; George W. Staup and J. B. Cheuvraunt, both of Lonaconing, Md., and others.

Little Rock, Ark.—Gas Machines.—Perkins Gas Co. incorporated with $25,000 capital stock to deal in gas machines by M. A. Perkins (president), M. M. Perkins and H. S. Johnson.

Marlow, Okla.—Elevator.—Yukon Elevator Co. incorporated with $10,000 capital stock by J. E. Shields and E. G. Fisher, both of Marlow; J. F. Kroutil, Yukon, Okla.

Macon, Ga.—Steam Laundry.—Crescent Laundry Co. awarded contract to R. H. Smalling & Sons for proposed laundry building, to cost $16,000, after plans by Frank R. Happ.

Marfa, Texas.—Drugs.—Union Drug Co. incorporated by J. A. Yates, T. C. Mitchell, R. S. McCracken and others.

Memphis, Tenn.—Steam Laundry.—Bluff City Laundry Co. incorporated with $15,000 capital stock by C. M. Ashford, J. C. Humphries, W. M. Rhea and others.

Meridian, Miss.—A. H. George Company incorporated with $30,000 capital stock by A. H. George, V. L. Crawford and others.

Meridian, Miss.—Telephone and Telegraph Systems.—People's Long Distance Telephone & Telegraph Co. incorporated with $10,000 capital stock by J. L. Peavey, R. W. Wiggins and Gabe Jacobson.

Middletown, Md.—Land Improvement.—Middletown Improvement Association of Frederick County incorporated with $5000 capital stock to develop the Crone tract of land, dividing it into streets, laying concrete sidewalks, etc. Town will lay water mains. Company is having plans prepared for erection of school building to cost $12,000. Edward A. Toms, William W. Doub, Albert S. Remsburg, John D. Keller and others are the incorporators.

Nashville, Tenn.—Drugs.—Sand & Sumpter Drug Co. incorporated with $15,000 capital stock by J. B. Sand, J. Rhea Sumpter, John E. Shelton and others.

Paragould, Ark.—Land Improvement.—Brookland Land Co. incorporated with $25,000 capital stock; M. F. Collier, president; Saul Bertig, vice-president; J. H. Kitchens, secretary, and A. Bertig, treasurer.

Petersburg, Va.—Peanut Plant.—Levy Peanut Co. (recently reported incorporated with Myer Saal, president, and Sidney Fischer, secretary-treasurer) will establish plant in rented buildings at 36-38 Ballingbrook street; will clean, shell and grade peanuts; daily capacity, 1500 bushels.

Pollock, La.—Telephone System.—M. M. Mandot, Alexandria, La., and C. O. Groves of Pollock will install telephone system.

Quincy, Fla.—Tobacco Farm.—Gadsden Sumatra Tobacco Co., recently reported incorporated, will establish tobacco firm; will erect buildings and make improvements at cost of about $30,000; B. H. Hardaway, president; W. M. Manly, manager.

Richmond, Va.—Printing Plant.—Walthall Printing Co. incorporated with $15,000 capital stock; A. J. Parrish, president, and R. B. Walthall, secretary-treasurer; will take over and continue book and job printing business of Walthall Printing Co.; address, Box 486.

Rodessa, La.—Land Improvement.—Rodessa Land & Development Co. incorporated with $84,000 capital stock to develop real estate in Rodessa and Caddo parish; J. D. Lee, president; Dr. W. M. Ledbetter, first vice-president; Alexander R. MacDonald, second vice-president; W. A. Stephens, secretary, and Dr. S. Y. Alexander, treasurer, all of Shreveport, La., where offices are located.

Sarita, Texas.—Fruit Farm.—Sarita Citrus & Farm Co. incorporated with $30,000 capital stock to grow fruit, vegetables and tobacco by Sam Carman of Sarita; S. H. Dixon, Houston, Texas; F. W. Brockman and H. E. Boswell, both of St. Louis, Mo.

Shreveport, La.—Cannery.—I. O. Saxon of the O. Pressprich Company, New York, N. Y., contemplates organizing company with $10,000 capital stock to establish cannery, in which $8500 will be invested.

Staunton, Va.—Spraying Company.—Virginia Landscape & Maintenance Co. of Roanoke, Va., will establish branch office in Staunton; W. E. Tribbett, manager. Company contracts to spray orchards, estates, city shade trees, parks and cemeteries.

St. Joseph, Mo.—Plumbing.—C. F. Rock Plumbing & Lighting Co. incorporated by Charles F. Rock, Herman D. Brach, Margaret and Elsie Brach.

Sutherland Springs, Texas—Resort.—Sutherland Springs Development Co. will be incorporated with $70,000 capital stock to improve Sutherland Springs as pleasure resort, and will erect natatorium, pavilions, construct streets, etc.; G. M. McGill, president; J. L. Kerr, vice-president, and Semp Ruus, secretary-treasurer, all of San Antonio, Texas.

Tennessee Ridge, Tenn.—Fruit Growing.—Fruit Ridge Orchard Co. incorporated with $5000 capital stock. Company owns a canning factory and 1000 acres of land with 10,000 trees, and expects to plant about 30,000 more trees; J. S. Johnson, president; J. S. Goslee, vice-president; W. L. Swarmstedt, treasurer, and C. O. Johnson, secretary.

Trezevant, Tenn.—Telephone System.—Trezevant Telephone Co., recently reported to construct telephone system, has completed organization with Oliver C. Sloan, president; William G. Quinn, vice-president; R. E. Ware, secretary, and M. F. Hurdle, treasurer.

Tulsa, Okla.—Oil Wells.—Hub Oil Co. incorporated with $500,000 capital stock by John W. Hayner and William M. Robbins, both of Tulsa; Llewellyn Lothrop, Gloucester, Mass.

Washington, D. C.—Automobile Transit Line.—Auto-Transit Co., Peter H. Hughes, vice-president, Philadelphia, Pa., has applied to District Commissioners for privilege of operating a line of electric passenger automobiles in the city.

MISCELLANEOUS MANUFACTURING PLANTS

Atlanta, Ga.—Suspender Factory.—Southern Suspender Co., 58-60 West Mitchell street, is reported to increase manufacturing capacity.

Atlanta, Ga.—Brewery.—Atlanta Brewing & Ice Co., Albert Steiner, president, is reported to be planning the manufacture of non-alcoholic beer.

Augusta, Ga.—Broom Factory.—J. H. Schroeder and H. Sancken have purchased the Augusta Broom Manufacturing Co.'s plant, and expect to operate factory by February 1; later may enlarge plant.

Baltimore, Md.—Bakery.—George H. Becker, manager of National Biscuit Co., 1114 North Appleton street, has purchased adjoin-

ing lot, 64x103 feet, to company's plant, and. it is reported, will erect addition.

Beaumont, Texas—Marble Works.—D. M. Dearing, Glasgow, Ky., will erect two-story frame building, 40x75 feet, to be equipped as marble works. Mr. Dearing will reside in Beaumont.

Columbus, Ga. — Mattress Factory.—Hygienic Mattress Manufacturing Co. is having plans prepared for erection of mattress factory. Company is composed of F. M. Frederick, H. W. Garrett and A. H. Cooper. (Mentioned in November.)

Corydon, Ky. — Flour and Grist Mill. — Corydon Milling Co. incorporated with $15,000 capital stock to continue manufacture of flour and meal; capacity 100 barrels flour and 100 bushels meal daily.

Ellijay, Ga.—Marble Works.—King Marble Co. incorporated with $1,000,000 capital stock to establish marble works by Wilmer C. King and others, all of Detroit, Mich. (See item under "Mining.")

Fort Smith, Ark.—Asphalt Plant.—Sterling Asphalt Co., recently reported incorporated by C. E. Speer and others, will establish plant for the manufacture of roofing materials; building will be erected and equipped at cost of $5000; secretary-treasurer, John C. Gordon; engineer, S. G. Wright, Chanute, Kan.

Grafton, W. Va.—Sink and Lavatory Factory.—Reported that a porcelain enameling sink and lavatory manufacturing company contemplates establishing plant in Grafton. R. M. Parrish of Grafton can give information.

Hagerstown, Md.—Bottling Works.—To-Ko Company incorporated with $60,000 capital stock by Harry L. Meredith, Harry R. Rudy, Francis H. Miller and others to manufacture beverages.

Imboden, Ark.—Corn Mill and Elevator.—J. L. McKamry will erect corn mill and elevator; building to be 30x45 feet; machinery will be installed; engineer in charge, G. H. McCarroll; plans for mill by owner. (See "Machinery Wanted.")

Kenova, W. Va.—Medicine Factory.—Lloyd Medical Co. incorporated with $15,000 capital stock by L. Lloyd of Kenova, Jesse Watts, A. N. Thompson, E. B. Robe and S. H. Bowman, all of Huntington, W. Va., to continue medicine factory of Mr. Lloyd.

Lexington, Ky. — Mattress Factory. — M. Kohn & Bro., Jackson, Ky., have established mattress factory in Lexington at 411 Oak street.

Louisville, Ky. — Bakery. — Creasy Baking Co. incorporated with $5000 capital stock by P. B. Scruggs, L. L. Creasy and A. G. Sacksteder.

Lynchburg, Va.—Shoe Factory.—Lynchburg Shoe Co. incorporated with $300,000 capital stock; R. A. Carrington, president; John S. Witt, vice-president, and Wirt H. Miller, secretary-treasurer.

Macon, Ga.—Beverages.—Acme Brewing Co. will convert brewery into plant for manufacturing a non-alcoholic beer, ginger ale and ginger beer.

Madison, Tenn.—Drugs. — Madison Drug Co. incorporated with $5000 capital stock by J. L. Gee, W. D. Washington, M. Cerf and others.

Memphis, Tenn.—Bed Factory.—Rose Spring Bed Co. incorporated with $35,000 capital stock by M. E. Rosenberg, Herman Blumenthal, Max Heilbronner and others.

Mississippi — Cotton-oil Mill. — Farmers' Union Cotton Oil Co. will establish cotton-oil mill; cotton-oil machinery and power to be installed; brick and concrete building; plans by J. H. Meyer, Houston, Texas. (See Machinery Wanted.)

Nashville, Tenn.—Cleaning Compounds.—James Cassetty has established plant for manufacturing cleaning and sanitary compounds. M. C. Trollinger will be in charge of manufacturing.

New Orleans, La.—Bottling Works.—Blue Seal Bottling Co. incorporated with $25,000 capital stock by Wilhelm Graeb, S. J. K. Johnston and Oscar T. Jones.

Oklahoma City, Okla.—Paper-box Factory. Enterprise Paper Box Co. incorporated with $20,000 capital stock by A. J. McMahan of Oklahoma City, Robert Dobson and Ole Rouning, both of Chicago, Ill.

Paducah, Ky.—Medicine Factory.—Walkers' Tonic Co. incorporated by Henry Arenz and Dan Fitzpatrick to manufacture Walkers' tonic.

Pine Bluff, Ark.—Medicine Factory.—The Watson Company incorporated with $5000 capital stock to manufacture medicines; John W. Watson, president; Louis H. Cohn, vice-president.

Portsmouth, Va.—Cigarette Factory.—Anti-toxic Cigarette Co. is name of company recently reported organized with $22,500 capital stock by J. C. Darst and others to establish cigarette factory; will manufacture antitoxic cigarettes. (See "Machinery Wanted.")

Richmond, Va. — Bottle Factory.—Non-Refillable Bottle Co. incorporated with Thomas E. Parnell, Chattanooga, Tenn., president; C. B. Davis of Richmond, secretary-treasurer.

Richmond, Va.—Peanut Factory.—Allen & Smith Company incorporated with $10,000 capital stock; W. L. Allen, Greensboro, N. C., president; R. N. Pollard, vice-president, and P. M. Smith, secretary-treasurer, both of Richmond.

Salado, Ark.—Broom Factory.—Union Broom Co. will establish plant for the manufacture of brooms; has completed frame main building, 30x20 feet; will erect additions; machinery not yet purchased; will use hand-power at present; president, J. W. Scott; secretary, J. W. Harper; business manager, W. H. Gatling. (See "Machinery Wanted.")

Selma, Ala.—Fertilizer Factory.—Culpepper Exum of Birmingham will not establish fertilizer factory; recently incorrectly reported.

Shreveport, La.—Cannery.—North Louisiana Truck Growers' Association and Shreveport Progressive League will organize company capitalized at $10,000 to establish cannery. H. A. Norton and E. M. Hager have been appointed to promote organization.

St. Louis, Mo.—Bakery.—Papendick Bakery Co. incorporated with $14,000 capital stock by Gustav Papendick, Gustav C. Papendick, Charles Goeckler and others.

St. Louis, Mo.—Brewery.—National Brewery Co. is having plans prepared by E. C. Janssen, Chemical Building, for erection of boiler-house and washhouse; two stories; former to be of brick, stone and reinforced concrete and cost $20,000, and latter of brick and reinforced concrete, costing $15,000.

St. Louis, Mo.—Medicine Factory.—W. H. Bell Medicine Co. incorporated with $50,000 capital stock by Michael L. Houts, Fannie J. G. Raymond, Henry S. Spangler and others.

St. Louis, Mo.—Mechanical Specialties.—Standard Specialty Co. incorporated with $60,000 capital stock to manufacture mechanical specialties by R. P. Prewitt, A. G. Meier, C. D. Lukens and others.

St. Louis, Mo.—Brush Factory.—Lafayette Brush Manufacturing Co. incorporated with $5000 capital stock by William Koopman, August Koopman, Joseph F. Schelbrink, Oscar Schowalter and others.

Suffolk, Va.—Grain Mills.—Virginia Mills incorporated with $15,000 capital stock and privilege of increasing to $50,000 to operate meal and hominy mills, deal in grain, etc.; mill will be erected and equipped at cost of $15,000; daily capacity 2500 bushels meal and hominy; W. W. Robertson, president; W. E. Flournoy, vice-president, both of Norfolk, Va., and J. W. Simmons of Suffolk, secretary-treasurer. Company has purchased plant of R. C. Barton. (See "Machinery Wanted.")

Vicksburg, Miss.—Bakery.—Union Bakery incorporated with $3000 capital stock by C. J. Edwards, W. R. Edwards and others.

Wheeling, W. Va.—Medicine Factory.—Annoqua Specialty Co. incorporated to manufacture and sell proprietary medicines by G. L. Ormiston, W. H. Sweeney, L. R. Creighton and others.

RAILWAY SHOPS, TERMINALS, ROUNDHOUSES, ETC.

Bainbridge, Ga.—Georgia, Florida & Alabama Railway will erect roundhouse, machine shop and power-house and blacksmith shop; roundhouse to be of frame construction with six stalls; machine shop, frame, 60x90 feet; power-house and blacksmith shop, brick, 26x42 feet; plans by Philip E. Robinson, National Building, Savannah, Ga., and Masonic Temple, Jacksonville, Fla.

Fernandina, Fla.—Phosphate Elevator.—Seaboard Air Line Railway, W. L. Seddon, chief engineer, Portsmouth, Va., has awarded contract to Burwell & Hillyer of Jacksonville and F. A. Von Ebstein, Savannah, Ga., for structural work on phosphate elevator, mentioned in October; capacity, loading 2000 tons per day; $75,000 has been appropriated; work will soon begin. A. G. Bagnell is engineer in charge.

ROAD AND STREET IMPROVEMENTS

Dallas, Texas.—Texas Bitulithic Co. has contract for paving Ross avenue.

Hillsboro, Texas.—City contemplates improvements to streets. Address The Mayor.

Memphis, Tenn.—City will pave Mississippi boulevard from Iowa avenue southward. Portion will be paved with vitrified brick on concrete foundation, and remainder with cementing gravel, with brick gutters and granite curbing. Contract will be awarded January 8; cost $10,000; James H. Malone, Mayor, Ennis M. Douglass, City Register. (See "Machinery Wanted.")

Muskogee, Okla.—City will build 10 miles of cement sidewalks. Address The Mayor.

St. Petersburg, Fla. — City voted December 31 on issuance if $4000 of bonds for street crossings and $9000 of bonds for widening Central avenue and 7th street south. Address The Mayor.

SEWER CONSTRUCTION

Bennettsville, S. C.—City will issue about $25,000 of bonds for construction of sewerage system mentioned in September. Address The Mayor.

Bonham, Texas.—O'Neil Engineering Co., M. Griffin O'Neil, president, Dallas, Texas, has contract for construction of sanitary sewer system in Bonham, costing $20,000. Bids for material will be received by company in January.

Cumberland, Md.—Lefevre & Edwards, West Virginia Central Building, have contract to construct sewer on Little Frederick street; price $1800; sheet piling to be used in construction.

Elk City, Okla.—City has awarded contract to O'Neil Engineering Co., M. Griffin O'Neil, president, Dallas, Texas, for construction of sanitary sewer system, for which $20,000 bonds were mentioned in September as voted. Company will receive bids for material in January.

Houston, Texas.—City will vote January 28 on issuance of $300,000 of bonds for construction of drainage sewers; H. B. Rice, Mayor.

Norfolk, Va.—Seventh Ward Local Board, J. D. Hank, secretary, has petitioned finance committee of Councils to approve an appropriation of $50,000 for contemplated sewer construction in Seventh Ward. (Recently mentioned.)

Joplin, Mo.—City has voted $96,000 of bonds for extension of sewerage system. Burns & McDonnell, engineers, Kansas City, Mo., were recently mentioned as having prepared plans.

Okmulgee, Okla.—City has awarded contract to O'Neil Engineering Co., M. Griffin O'Neil, president, Dallas, Texas, for the design and construction of improvements to sewerage system at Okmulgee. Bids for material will be received by company during early part of January. (See item under "Water-works.")

St. Petersburg, Fla. — City voted December 31 the issuance of $5000 of bonds for sewer extension. Address The Mayor.

Tyler, Texas.—Tyler Sewer Co. incorporated with $20,000 capital stock by W. G. Cain, Ben B. Cain, L. L. Jester and C. W. Kouns.

TEXTILE MILLS

Buffalo Shoals (not a postoffice), N. C.—Cotton Yarns.—Long Island Cotton Mills is understood to be completing arrangements to begin construction of proposed 5000-spindle yarn plant; also for construction of water-power-electrical plant to operate mill. Reports state mill will have 10,000 spindles instead of 5000 at first announced; Osborne Brown of Long Island, N. C., president; George H. Brown of Statesville, N. C., treasurer. (Announced in September.)

Charleston, S. C.—Cotton-waste Products.—Carolina Waste Mill incorporated with capital stock of $200,000 to build mill for manufacturing cotton-waste products; directors, A. C. Tobias, Ellison A. Smyth, John A. Law, James D. Hammett and others. Address company care of Miller & Whaley, 35 Broad street. (Recently mentioned.)

Fairmont, S. C.—Tyger Cotton Mills has no plans for building another mill and developing water power for more power. (Recently erroneously mentioned.)

Columbus, Miss.—Cotton Twine.—Columbus Manufacturing Co. will install machinery for manufacturing cotton twine; daily output to be 1000 pounds; all equipment has been purchased.

Fayetteville, N. C. — Knit Goods. — J. P. Ewing of Dillon, S. C., will establish knitting mill at Fayetteville; has building which will be enlarged and improved to receive knitting machinery; probably electricity will be motive power, supply to be obtained from transmission of Cape Fear Power Co.

Fort Worth, Texas — Cotton Cloth and Yarns.—Texas Farmers' Union plans to organize companies for building cotton-cloth and yarn mills throughout State.

Kinston, N. C.—Knitting Yarns.—Kinston Cotton Mills has nearly completed addition previously reported; 45x75 feet; 5000 spindles and power plant now being installed; present equipment 12,000 spindles.

Munford, Ala.—Hosiery Yarns.—Munford Cotton Mills, detailed in September, has accepted plans for buildings and begun construction; as previously stated, equipment will include 2500 spindles for manufacturing hosiery yarns. N. C. Camp is president.

Tallapoosa, Ga.—Warps and Skeins.—Tallapoosa Mills has completed mill building and warehouse, each two stories high, of brick; has capacity of 12,500 spindles, but will install only 10,000 to begin with; power to be furnished by 600-horse-power engine; all machinery has been purchased. R. C. Bibberstein of Charlotte, N. C., is the architect in charge; A. J. Jackson is company's president.

WATER-WORKS

Bennettsville, S. C.—City will issue about $25,000 of bonds for construction of water-works mentioned in September. Address The Mayor.

Bronte, Texas.—City will construct water-works, water to be secured from the Colorado river, about three miles distant. G. H. Cumberland, City Engineer, is preparing specifications and making surveys.

Clover, S. C.—City contemplates laying six-inch water mains on Main street. Address The Mayor.

Daytona, Fla.—City contemplates election to vote on issuance of about $50,000 of bonds for construction of water-works and for fire protection. Address The Mayor.

Elk City, Okla.—O'Neil Engineering Co., M. Griffin O'Neil, president, Dallas, Texas, has contract for extensions and improvements to municipal water supply and machinery plant, for which $20,000 bonds were mentioned in September as voted. Company will receive bids for material in January.

Eureka Springs, Ark.—City contemplates improvements to water-works. Address The Mayor.

Fernandina, Fla.—City will lay water main from Chester street to Old Town; contract will be awarded January 15; G. L. Baltzell, City Clerk. (See "Machinery Wanted.")

Headland, Ala.—City has voted issuance of $23,500 of bonds for construction of water-works and electric-light plant. Address The Mayor. (Recently mentioned.)

Homer, La.—City has awarded contract to O'Neil Engineering Co., M. Griffin O'Neil, president, Dallas, Texas, for construction of water-works to cost about $40,000. Bids for material will be received by company in January. (City Council was mentioned in October as having authorized the issuance of $40,000 of bonds.)

Houston, Texas.—City will vote January 28 on issuance of $200,000 of bonds for extending water mains; H. B. Rice, Mayor.

Okmulgee, Okla.—City has awarded contract to O'Neil Engineering Co., M. Griffin O'Neil, president, Dallas, Texas, for rebuilding and increasing water supply and distribution system for water-works and for designing and constructing improvements to sewerage system at Okmulgee, total cost of which is $67,000. Company will receive bids for material in January.

Russellville, Ark.—C. S. Bacon, Pine Bluff, Ark., will construct water-works, for which franchise has been secured.

Speeds Addition, postoffice at Vicksburg, Miss.—H. M. Marshall is engineer in charge of proposed water-works, for which city was lately reported as voting $20,000 in bonds; J. W. Hayes, Mayor.

St. Louis, Mo.—West St. Louis Water & Light Co., which supplies St. Louis county with water, is reported to lay 13 miles of pipe in the county and erect two water towers, one to be located on Stratman Hill and other near Normandy, Mo. Each tower will be 65 feet in diameter, about 125 feet high and have capacity of 750,000 gallons.

St. Petersburg, Fla. — City voted December 31 on issuance of $12,000 of bonds for purchasing portion of lake not owned by city and for improving water supply. Address The Mayor.

Teague, Texas.—City will vote January 2 on issuance of $50,000 of bonds for construction of water-works. Maxcy Engineering Co., Houston and Dallas, Texas, is now making surveys of streets. (Recently mentioned.)

WOODWORKING PLANTS

Carbon Hill, Ala. — Woodworking. — Ice Utilities Manufacturing Co. will install machinery for general woodworking. (See "Machinery Wanted.")

Chattanooga, Tenn.—Woodworking.—E. J. Noblett Company, 121st and Green streets, Chicago, Ill., contemplates establishment of woodworking plant; details to be given later. (Lately mentioned under East Lake, Tenn.)

Columbus, Ga.—School Desks, etc.—Standard School Desk Manufacturing Co. incorporated with capital stock of $20,000 by M. O. Berry, J. B. Banks, John T. Norman and George C. Palmer. Company has purchased property of Columbus Crate Co. and adjacent land; expects to build large foundry; will manufacture opera chairs, church and school furniture. Architect is preparing plans, and construction will begin in January; buildings to have automatic sprinklers; considerably machinery is to be purchased. Mr. Berry is president, and was lately referred to in this connection. (See "Machinery Wanted.")

Concord, N. C.—Reported that J. M. Odell will establish woodworking plant.

Siler City, N. C.—Bentwood Stock.—High Point Bending & Chair Co. will rebuild plant recently burned; will continue manufacture of bentwood stock for chair and woodworking factories; S. H. Tomlinson, president and treasurer; W. P. Brown, superintendent. (See "Machinery Wanted.")

St. Louis, Mo.—Building Materials.—American Tie & Timber Co. incorporated with $50,000 capital stock by Adiel S. Dodge, Joseph E. Henderson and Ernest C. Dodge to manufacture and deal in building materials.

Van Buren, Ark.—Boxes.—J. W. Ledbetter, John M. Berry and C. D. Fairfield, Rome, Ga., are names of capitalists recently reported as contemplating establishment of box factory in Van Buren, investing about $50,000; organization will probably be effected at meeting to be held January 4. It is intended to manufacture fruit cases of all kinds, packing cases, baskets, etc.

Vicksburg, Miss. — Woodenware. — Cedars Manufacturing Co. incorporated with $100,000 capital stock to manufacture fancy woodenware by J. F. Conant, Arthur E. Chapman, Oliver S. Brown, E. M. Barnard, Jr., and others.

Warren, Ark.—Vehicle Stock.—Warren Vehicle Stock Co. has increased capital stock from $25,000 to $50,000; F. J. Suydham, president.

Wilson, N. C.—Shingles.—W. M. Simms Company has increased capital stock from $25,000 to $40,000.

BURNED

Abbeville, Ga.—Anderson Hotel; J. T. Anderson, proprietor.

Argenta, Ark.—S. Gershner's building; loss $30,000.

Atlanta, Ga.—W. O. Jones' residence; loss $10,000.

Baltimore, Md.—Baltimore Badge & Novelty Co.'s plant, Third avenue and Carroll street, Woodberry; loss, stock and machinery, $40,000; building, $10,000.

Baton Rouge, La.—Julius Barrillier's residence; loss $4000.

Big Stone Gap, Va.—The Rutherford Block, occupied by J. F. Skeen and J. B. Sherman; loss about $15,000.

Bowling Green, Ky.—A. A. McGinnis' residence; loss $4500.

Carrollton, Ga.—Stone Hotel; loss $10,000.

Charlotte, N. C.—Queen City Printing & Paper Co.'s plant; building owned by the Carson estate.

Chalker, Ga.—E. M. Sparks' cotton gin.

Cool Spring, N. C.—Broaddus & Ives' sawmill; loss $7000.

Fort Smith, Ark.—Haglin Building, loss $60,000; American National Bank Building, damaged, loss $20,000; Mayo Building, loss $15,000; T. J. Smith's building, loss $5000.

Granbury, Texas.—Dan Cogdell's residence; loss $25,000.

Helena, Ga.—King & Cook's sawmill at Shamrock Springs.

Hurricane, Ala.—Shank-Ellis Milling Co.'s plant; loss $15,000.

Louisville, Ky.—Commercial Building damaged; David Baird and Aaron Kohn, owners; loss about $10,000.

Memphis, Tenn.—First Church of Christ, Scientist; loss about $30,000. Address The Pastor, First Church of Christ, Scientist.

Marion, S. C.—J. Quince Berry's cotton gin, sawmill, barn and store building; loss $6000.

Neches, Texas.—Seaver's Hotel; P. W. Ezell & Co.'s warehouse; John B. McDonald's warehouse.

Ogle, Texas.—John McIlhaney's residence; loss $4000.

Owenton, Ky.—Hutchinson Clothing Co.'s building; loss $20,000.

Pine Beach, Va.—Hotel Portsmouth, owned by Louis Kootz, 1000 South 6th street, Portsmouth, Va.; Virginia Inn; The Owl; The Colonial Restaurant.

Register, Ga.—Register Trading Co.'s store building; loss $20,000.

Romney, W. Va.—Robert M. Washington's barn; loss $17,000.

Rutherfordton, N. C.—Rutherford county's courthouse; loss about $60,000. Address County Commissioners.

Shreveport, La.—Queen City Furniture & Manufacturing Co.'s plant; loss $108,000.

Siler City, N. C.—High Point Bending & Chair Co.'s plant; loss $6000.

Vicksburg, Miss.—J. J. Hays' cotton office; buildings owned by Sam Romano.

BUILDING NOTES

***Means machinery, proposals or supplies are wanted, particulars of which will be found under head of "Machinery, Proposals and Supplies Wanted."**

APARTMENT-HOUSES

Bellevue, P. O. at Newport, Ky.—John Lehmann is having plans prepared by C. C. & E. A. Weber, Cincinnati, Ohio, for erection of cafe and apartment-house to cost $15,000.

Elm Grove, W. Va.—George Bushon has had plans prepared by George H. Dieringer for erection of store and apartment-house; 60x80 feet; two stories; concrete blocks.

Hannibal, Mo.—Meffard Bros. have had plans prepared for erection of two-story brick and stone double apartment-house.

Louisville, Ky.—M. F. Greenstein has had plans prepared by George B. Hitchings, Eultable Building, for erection of apartment-house; three stories; brick and stone; steam heat.

New Cambria, Mo.—C. M. Cole will erect double apartment-house; brick; cost about $8000. Plans by Courtney Bros., Hannibal, Mo.

Portsmouth, Va.—Portsmouth Realty Corporation will erect two-story brick apartment house at a cost of $3000.

St. Louis, Mo.—T. C. Lee Architectural Co., Mercantile Building, will prepare plans for erection of two-story store and apartment-house, 60x80 feet, costing about $20,000.

St. Louis, Mo.—J. Grunwald will erect $5000 apartment-house; brick and stone; composition roofing; gas lighting; size, 19 feet 6 inches by 42 feet 6 inches; plans by E. J. Hess, 3416 Arsenal street; contractor, Arthur Hess, 3508 Connecticut street.

St. Louis, Mo.—Kinsey Realty & Building Co. will erect two-story double apartment-house; 50x65 feet; brick, stone and terra-cotta; cost $15,000.

Washington, D. C.—Harry Wardman, builder, 1333 G street N. W., will erect two three-story brick and stone apartment houses with modern conveniences at 1410-1412 Euclid street N. W., to cost $20,000; A. H. Beers, architect, 1333 G street N. W.

BANK AND OFFICE BUILDINGS

Alexandria, Tenn.—Bank of Alexandria contemplates erection of bank building to replace structure recently reported burned.

Chattanooga, Tenn.—Southern Express Co. has awarded contract to A. F. Hahn Building Co. for remodeling the Southern Hotel as office building, according to plans by Bearden & Foreman. About $12,000 will be expended (Recently mentioned.)

Hannibal, Mo.—Hannibal Trust Co., S. M. Carter, president, has had plans prepared by M. S. Martin for erection of office building; five stories; brick and stone; hot-water heating; cost about $100,000. (Recently mentioned.)

Harrisonburg, Va.—People's Bank of Harrisonburg is reported as considering erection of bank building. Committee appointed consists of James E. Rederd, I. N. Beery and Thomas J. Martin.

Jacksonville, Fla.—Southern Ferro-Concrete Co., Atlanta, Ga., has contract for concrete work on seven-story reinforced concrete temple and office building recently noted to be erected by Florida Grand Lodge, A. F. and A. M.; F. P. Heifner, Atlanta, Ga., general contractor.

Waynesboro, Va.—Augusta County Commissioners, Staunton, Va., will erect office building to contain auditorium and jail; cost $3000.

Yellville, Ark.—Miners and Citizens' Bank will erect bank building.

CHURCHES

Bainbridge, Ga. — Methodist Episcopal church will erect edifice after plans by W. B. Camp, Jacksonville, Fla.; red pressed brick with buff-brick trimmings; 60x110 feet; steam heat; electric lighting; cost $25,000; bids to be opened about February 20; J. W. Callahan, chairman building committee. (See "Machinery Wanted.")

Charlottesville, Va.—University of Virginia will erect church. Dr. Hugh M. McIlhany, Jr., will be in charge.

Lake Charles, La.—Presbyterian Congregation has adopted plans for erection of edifice, 65x115 feet; brick and stone; main auditorium 55x55 feet; Sunday-school room, 53x58 feet; colonial style; dome; cost, $20,000. Dr. J. Y. Allison, pastor.

Winchester, Ky.—Christian congregation has had plans prepared by Des Jardins & Sheblessy, Cincinnati, Ohio, for erection of edifice; Rev. J. H. MacNeill, pastor.

COURTHOUSES

Canyon, Texas.—Randall county has voted $53,000 of bonds for erection of courthouse; brick or stone; electric fixtures; A. N. Henson, County Judge. (Recently mentioned.)

Chattanooga, Tenn.—Bids will be opened February 11 at Treasury Department, office of James Knox Taylor, Supervising Architect, Washington, D. C., for construction (complete) of extensions to U. S. Postoffice and Courthouse at Chattanooga, in accordance with drawings and specifications, copies of which may be obtained at above office of Custodian at Chattanooga, at discretion of Supervising Architect.

Clarksville, Texas.—Red River county will open bids January 14 for erection of two-story addition to present county courthouse; plans by Glenn Bros., Hugo, Okla.; stone and concrete building; fireproof; 40x60 feet; cost, $20,000; lighting not decided. (Mentioned in November.)

Dimmitt, Texas.—Castro county has voted $28,000 of bonds for erection of courthouse, probably to be constructed of brick. Address County Commisioners. (Recently mentioned.)

El Paso, Texas.—M. Hughes is preparing plans for three-story brick annex to courthouse, for which bonds were recently noted to be voted on January 4; heating plant will be installed and electric lighting; cost $28,000.

Houston, Texas.—Harris County Commissioners have adopted plans by Lang & Witchell, Dallas, Texas, for erection of courthouse; classic style of architecture; four stories; 131x180 feet; height from basement floor to roof, 80 feet; district courtrooms, 38x53 feet; criminal courtroom, 56x65 feet; county courtroom, 53x55 feet, and commissioners' court, 24x38 feet; fireproof; foundation of concrete to ground line, reinforced with steel rods; walls from basement to second floor of Texas granite; remainder of St. Louis hydraulic face brick, with terra-cotta or stone columns; inside walls of common brick; roof of terra-cotta tile, laid in cement; dome, 40x40 feet, of reinforced concrete, representing imitation stone, with glass panels; stairs of cast iron, finished in ornamental bronze rails; square-shaped rotunda in center of building extending from basement to roof, on top of which will be the dome and tower; rotunda and floors of corridors laid in prism lights; two passenger elevators; fireproof steel vault to extend from basement on third story; circulating ice-water system will be installed and drinking fountains will be conveniently located. A bond issue of $500,000 has been voted by Harris county for erection of the building. It is understood that bids will probably be advertised for in February. A. E. Amerman, county judge; George F. Horton, county engineer; Frank Andrews, chairman citizens' committee. (Recently mentioned.)

New Orleans, La.—York & Sawyer, 156 Fifth avenue, and Hale & Rogers, 11 East 24th street, both of New York; C. C. Zantzinger & Hewitt, 251 South 4th street, and Stevents & Paist, both of Philadelphia, Pa., and Parker & Thomas, 1109 Union Trust Building, Baltimore, Md., have been selected as architects to enter second competition for plans for postoffice and courthouse to be erected in New Orleans at a cost not exceeding $1,200,000, exclusive of lighting fixtures, both gas and electric, and mural paintings; main street floor to contain not less than 50,000 to 55,000 square feet and accommodate divisions of postoffice, mechanical plant, etc.; second floor to contain about 35,000 square feet and be used mainly for United States courts; James Knox Taylor, Supervising Architect, Washington, D. C. (Mentioned recently.)

Towson, Md.—Baltimore County Commissioners will present bill at next session of Legislature authorizing erection of addition to courthouse.

DWELLINGS

Birmingham, Ala.—A. O. Bots has had plans prepared by J. M. Maddox for erection of residence; two stories; press brick and stone.

Birmingham, Ala.—Benj. F. Grosstin will erect brick and stone residence; plans by L. E. Walker.

Charlotte, N. C.—Charles E. Wood will erect residence.

Columbia, S. C.—Black & Coulter Co., recently noted to erect dwellings, will build 48 cottages of five, six and seven rooms each; electric lights; cost, $1000 to $2000 each; plans and construction by owner. This company is also contemplating early erection of three-story brick building. (See "Machinery Wanted.")

East Lake, Ala.—George Ivan has had plans prepared by R. E. Posey, Birmingham, Ala., for erection of three dwellings at East Lake; brick and stone.

Hannibal, Mo.—E. P. Courtney will erect brick and stone residence at a cost of about $7000; plans by Courtney Bros.

Kansas City, Mo.—Clifford Histed is reported as about to erect residence at cost of about $15,000.

Kansas City, Mo.—C. J. Devlin, Topeka, Kan., is reported as about to erect residence at cost of about $30,000.

Lanark, Fla.—Lanark Improvement Co. will erect four cottages; Spanish style; four rooms and bath; plans by Philip E. Robinson, National Building, Savannah, Ga., and Masonic Temple, Jacksonville, Fla.

Lawton, Okla.—Mrs. Charles Payne will erect residence to cost $20,000.

Louisville, Ky.—M. W. Burd will erect two-story brick residence; plans prepared by Geo. B. Hitchings, Equitable Building.

Miami, Okla.—A. D. Hatton will not erect residence recently mentioned before spring. (Southern Company, Webb City, Mo., was lately noted to prepare plans.)

New Orleans, La.—M. Avegno will erect two-story dwelling at cost of $8000.

Port Arthur, Texas.—Methodist Episcopal Church will erect parsonage on site 50x140 feet. Address The Pastor, Methodist Episcopal Church.

Moberly, Mo.—Mrs. Ida Barton will erect frame residence, 30x50 feet, at cost of about $7000.

Richmond, Va.—O. C. Peers will erect residence in Ginter Park, to cost about $7000, after plans by J. D. Carneal, Jr.; contract has been awarded.

Richmond, Va.—Frank Duke is having plans prepared by J. D. Carneal, Jr., for erection of residence in Ginter Park.

Richmond, Va.—George Thaxton has had plans prepared by C. K. Howell for erection of residence in Ginter Park; bids are now being received.

Richmond, Va.—Dr. J. Shelton Horsley, 303 West Grace street, will erect residence in Ginter Park.

Springfield, Mo.—E. M. Smith awarded contract to Wm. Seymour for erection of two-story brick residence after plans by Reed & Heckenlively; hot-air heating; combination lighting; cost $6000.

Springfield, Mo.—T. E. Willier will let contract in spring for $10,000 residence recently noted to be erected after plans by Reed & Heckenlively; two stories; brick; hot-water heating; combination lighting.

St. Louis, Mo.—Margaret E. Kehoe has had plans prepared by Preston J. Bradshaw, Mechanics' American Bank Building, for erection of residence; two stories, 36x40 feet; brick, stone and terra-cotta; cost $15,000. (Mentioned in November.)

St. Louis, Mo.—U Mark Realty Co. is having plans prepared by H. G. Clymer, Wainwright Building, for erection of 14 cottages; one story; brick and stone; cost $30,000.

St. Louis, Mo.—C. W. Temm will erect brick and stone residence to cost about $10,000; plans by William A. Lucas, Odd Fellows' Building.

St. Louis, Mo.—L. M. Barnett is having plans prepared by W. A. Cann, Missouri Trust Building, for erection of four residences; 32x32 feet; frame.

Webb City, Mo.—Thos. McCroskey will erect eight-room bungalow at cost of $7500; plans by A. C. Michaelis, Joplin, Mo.; superintendent of construction, Andrew Anderson; building will have steam heat and gas and electric lighting.

HOTELS

Alexandria, Tenn.—J. M. Agnew and others are organizing company to build hotel to replace structure recently reported burned.

Ballinger, Texas.—Central Hotel Co. incorporated by Joe B. Wilmeth, Jack McGregor, Tom Ard and W. A. Norman.

Corpus Christi, Texas.—J. W. Ennis will

open bids January 4 for construction of frame bathhouse, pavilion and annex combined to the Seaside Hotel. Plans and specifications on file at office of R. L. Pierce, architect, San Antonio, Texas, or at Seaside Hotel, Corpus Christi; certified check, $250; usual rights reserved. (Mr. Ennis, Batson, Texas, was mentioned in October as having purchased the Seaside Hotel and contemplating improvements.)

Lanark, Fla.—Lanark Inn will be erected to replace structure recently burned; two-story; cement stucco on brick; Spanish style of architecture; two-story fountain courts, tiled; about 30 bedrooms; four baths; sun parlor; plans by Philip E. Robinson, National Building, Savannah, Ga., and Masonic Temple, Jacksonville, Fla.

Norfolk, Va.—Monticello Realty Co. is considering an issuance of about $100,000 of bonds and improvements to Monticello Hotel. G. D. M. Sherman, Philadelphia, Pa., will conduct hotel after first of year; Caldwell Hardy and David Lowenberg, stockholders.

MISCELLANEOUS STRUCTURES

Alexandria, Tenn. — Business Building. — Jones Bros. contemplate erection of two-story brick business building to replace structure recently burned.

Alexandria, Tenn. — Business Building. — Shelby Malone contemplates erection of two-story brick building to replace burned structure.

Alexandria, Tenn.—Business Building.—R. B. Floyd contemplates erection of two-story brick building to replace burned structure; about 40x80 or 100 feet.

Atlanta, Ga.—Building.—A. W. Calhoun has awarded contract to W. W. Griffin for erection of building to be occupied by the Cable Piano Co. and the Atlanta Conservatory of Music; structure will be five stories high, with basement; 50x100 feet; pressed brick; contain auditorium; cost $60,000; plans have been prepared by Harry Leslie Walker. (Mentioned in November.)

Brenham, Texas.—G. Hermann & Son will erect store building to replace burned structure.

Bristol, Va.-Tenn.—Hospital.—King's Memorial Hospital will be erected; company will be incorporated; plans are being secured for basis of estimate; probable cost from $25,000 to $30,000; W. O. Came, chairman building committee. (Recently mentioned.)

Butler, Okla.—Hall.—Butler Hall Co. incorporated by J. B. Griffiths, T. W. Watcholtz and D. G. Barton.

Clifton Forge, Va.—Lodge Building.—Elks' Home, recently noted to be erected after plans by E. G. Frye, will probably be built on percentage; two stories and basement, 45x90 feet; ordinary construction; low-pressure steam heat; electric lighting; cost $20,000; J. H. Carlisle, chairman building committee.

Elm Grove, W. Va.—Business Block.—Conder, Birch & Lienweber Company is having plans prepared by Geo. H. Dieringer for fireproof business block with two storerooms on first floor, offices and flats on second floor; entire front of plate glass and copper construction, with white pressed-brick pilasters, etc.; Spanish Mission design; work to be commenced early in spring.

Galveston, Texas — Business Building. — Henry Hoffman and Claude Z. Brandt contemp'ate erecting one-story brick building adjoining Colonial Vaudeville Theater. (Recently mentioned.)

Greeneville, Tenn.—Lodge Building, etc.—Borches, Wardrep & Co., Knoxville, Tenn., have contract at $14,550 for erection of brick lodge and outbuilding, concrete walks and sidewalks, grading, etc., at National Cemetery, Greeneville; Major M. Gray Zalinski, Quartermaster, U. S. Army, in charge of depot, Washington, D. C. (Recently mentioned.)

Jacksonville, Fla.—Stockton & Budd, owners of Vehicle & Harness Co.'s building, recently reported burned at a loss of $20,000, will rebuild the structure. (W. W. Cleveland was erroneously mentioned as owner.)

Jefferson City, Mo.—Capitol Improvements.—Miller & Opel, architects, Jefferson City, Mo., will receive bids until January 10 at office of Southern Hotel, St. Louis, Mo., for remodeling hall of House of Representatives in Missouri State Capitol, Jefferson City; work consists of remodeling gallery and installing new ventilating system; plans, etc., on file at office of architects, Jefferson City.

Jennings, La.—Library.—Ladies' Library Association, Mrs. F. R. Jaenke, president, is considering erection of Carnegie library, for which $10,000 will probably be donated. Whitfield & King, New York, N. Y., have submitted plans, and it is understood that C. H. Page, Jr., Austin, Texas, will also prepare plans.

Kansas City, Mo.—Business Building.—Patterson & Sanford, New England Life Building, are having plans prepared by George Carman, Hall Building, for erection of five-story business building to be constructed of brick, stone and terra-cotta.

Kansas City, Mo. — Business Building. — James F. Halpin is having plans prepared by Louis Curtiss for rebuilding Pepper Building, partly burned last May. Construction material will include reinforced concrete, and the structure will be equipped throughout with sprinkler system.

Little Rock, Ark.—Library.—Carnegie Library Committee has adopted plans by E. L. Tilton, New York, N. Y., for erection of proposed library. Charles L. Thompson of Little Rock will be local superintending architect. Contract for excavation work has been awarded to J. E. McCoppin. (Mentioned in November.)

Memphis, Tenn.—Gymnasium and Dance Hall.—Germania Hall Building Co. is having plans prepared by John Gaisford, 478 Randolph Building, for repairs and changes to building; gymnasium and dance hall to be added; ordinary construction; steam heat; electric lighting; electric elevator; cost of additions $17,000.

Memphis, Tenn.—Y. M. C. A. Building.—Young Men's Christian Association will consider plans by John Gaisford for erection of proposed Y. M. C. A. building to cost between $150,000 and $200,000; site, 90x150 feet. (Mentioned in November.)

New Orleans, La. — Auditorium. — Colored Knights of Pythias of Louisiana have awarded contract to Charles A. Sicard for erection of auditorium; seven stories; roof garden; Diboll, Owen & Goldstein, architects.

Paris, Mo.—Infirmary.—Monroe county will have plans prepared by George V. McDonald for brick and stone infirmary to cost about $75,000; bids will soon be received; J. N. Magruder, county clerk. (Mentioned in November.)

Richmond, Va. — Mercantile Building.—S. T. Beveridge will erect business building to be occupied by Morrison Machinery & Supply Co. (Purchase of site recently mentioned.)

Springfield, Mo. — Hospital. — Burge Deaconess Hospital, for which S. J. Bartlett, 779 West Elm street, was recently noted to have contract, will be erected at cost of $20,000; 38x100 feet; three stories and basement; brick; steam heat (contract let); gas and electric lighting; automatic electric elevator; plans by Reed & Heckenlively. (See "Machinery Wanted.")

St. Louis, Mo.—Dancing Academy.—H. W. Trimp will erect dancing academy; three stories; 73x142 feet; gas and electricity; cost $40,000; plans by George H. Kennerly, Benoist Building.

St. Louis, Mo.—Store Building.—J. C. Smith Piano Co. is having plans prepared by W. A. Cann, Missouri Trust Building, for remodeling store building at cost of $10,000.

St. Louis, Mo.—Store Building.—Consolidated Investment Co. is having plans prepared by H. F. Roach for remodeling building of N. O. Nelson Manufacturing Co. Reconstruction work will be supervised by Holbrook-Blackwelder Real Estate Trust Co.

Tulsa, Okla.—Hospital.—Tulsa Hospital Association, Dr. Fred S. Clinton, president, will erect hospital; three stories; 40x60 feet; brick; cost $20,000; construction work will soon begin.

MUNICIPAL BUILDINGS

Alexandria, La.—City Hall.—Contract for erection of city hall and administration building has not been awarded to F. B. Hull Construction Co. as recently noted. Contract is not yet closed.

Chattanooga, Tenn. — City Hall.—Joseph Trimby, lately mentioned as lowest bidder at $157,750 for erection of City Hall, has been awarded contract. (Full details in recent mention.)

Sikeston, Mo.—City Hall and Jail.—Bids received for erection of City Hall and jail; two stories; 60x80 feet; brick and stone; cost about $30,000. Matthews & Clarke, Missouri Trust Building, St. Louis, Mo., prepared plans. E. J. Malone, Mayor. (Mentioned in August.)

St. Louis, Mo.—Police Station.—Board of Police Commissioners is having plans prepared by James A. Smith, City Hall, for erection of police station; three stories; 146x89 feet; cost $50,000.

RAILWAY STATIONS

Fort Smith, Ark.—Kansas City Southern Railway has awarded contract to Blanchard Construction Co., Topeka, Kan., for erection of proposed freight depot; 40x250 feet; fireproof; electric lighting; cost about $20,000. (Mentioned in October.)

SCHOOLS

Alpine, Texas—J. D. Jackson has postponed date of opening bids for erection of school building from December 10, as previously stated, to February 17; structure will be of brick, stone or concrete blocks, and separate proposals are solicited; plans and specifications on file at office of H. T. Phelps, architect, San Antonio, Texas, and of E. F. Higgins at Alpine; certified check $500; usual rights reserved.

Charlotte, N. C.—City contemplates purchasing site 179x200 feet on which to erect school building. Address The Mayor.

Coleman, Texas.—I. L. Bragg has contract for erection of school building; brick; stone foundation; fireproof; metal roof; 10 rooms; steam heat; M. L. Waller, Fort Worth, Texas, architect. (Recently mentioned.)

Conway, Ark.—B. W. Torreyson, secretary Board of School Trustees of Little Rock, Ark., will open bids January 15 for erection of proposed normal school building in Conway, recently mentioned. Separate bids will be received for heating, plumbing and wiring; certified check $500, payable to secretary; plans, etc., on file at office of secretary, Board of Trade, Conway, and office of Charles L. Thompson, architect, Little Rock, Ark. (See "Machinery Wanted.")

Corsicana, Texas.—Normangee School Board will open bids January 14 for erection of $3000 brick school building; usual rights reserved; plans and specifications on file at office of H. B. Lochhead, architect.

Lutherville, Md.—Board of School Commissioners of Baltimore county, Towson, Md., has purchased site 100x150 feet in Lutherville on which to erect school building.

Lynchburg, Va.—Randolph-Macon Woman's College will erect gymnasium recently mentioned; plans by E. G. Frye; mill construction; 100x50 feet; steam heat; gas lighting; gymnasium apparatus, lockers, etc., will be installed; cost of building, $25,000; to be built on percentage; J. P. Pettyjohn & Co., contractors, may be addressed.

Middletown, Md. — Middletown Improvement Association of Frederick County is having plans prepared for erection of school building to cost $12,000. (See item under "Miscellaneous Enterprises.")

Minden, La.—City has voted five-mill tax for erection of school building to cost $5000. Address The Mayor.

Rison, Ark.—J. F. Swanson has prepared plans for erection of school building. (Recently mentioned.)

San Angelo, Texas.—City will vote January 21 on issuance of $34,000 of bonds for erection of two ward school buildings; secretary board of trustees, C. W. Hobbs. (Mentioned in October.)

St. Petersburg, Fla. — City voted December 31 on issuance of $25,000 of bonds for erection of school building. Address The Mayor.

St. Louis, Mo.—St. Philomena's Industrial School is having plans prepared by Barnett, Haynes & Barnett, Frisco Building, for erection of industrial school building; four stories; brick and stone; gas and electricity.

St. Louis, Mo.—William Ittner, 9th and Locust streets, will prepare plans for erection of addition to Humboldt school building to cost about $50,000.

THEATERS

Atlanta, Ga.—Atlanta Theater Co. has had plans prepared by Edward Odell, Jr., Montgomery, Ala., for erection of proposed Bijou Theater; brick and stone; lobby to have marble wainscoting and mosaic tiling; stage 82x38 feet; cost $75,000. Jake Wells, Richmond, Va., is chief promoter.

Dothan, Ala.—Ben R. Pilcher will erect opera-house, 150x100 feet; plans have been prepared.

Gadsden, Ala.—Hayden-Pake Theater Co., Demopolis, Ala., has had plans prepared by Carl Boller, Kansas City, Mo., for erection of theater and office building; 75x125 feet; reinforced-concrete construction; steam heat; electric lighting and ordinary theatrical electrical equipment; cost $30,000. As recently mentioned, contract for erection has been awarded to the Vulcan Construction Co., Grant Wyatt, secretary, 523 Liggett Building, St. Louis, Mo.

Galveston, Texas.—Hornsby & Hulsey, proprietors of Majestic and Lyric Theaters in Galveston, and John Dickey, proprietor and manager of Lyric Theater of Houston, Texas, are arranging for erection of theater in Galveston with seating capacity of 1000 on ground floor and 500 in balcony.

Memphis, Tenn.—Germania Building Co. is having plans prepared by John Gaisford for remodeling Germania Hall as theater and lodge building, improvements to include erection of two additional stories.

WAREHOUSES

Baltimore, Md.—Baltimore Iron & Metal Co., L. and A. Horwitz, proprietors, 1607 Gough street, has awarded contract to Silberstein Bros., 557 Calvert Building, for construction of warehouse on Gough street between Broadway and Bethel street; three stories, 22x70 feet; brick with stone trimmings; mill construction; modern conveniences; Jacob F. Gerwig, architect, Hoffman Building.

Chattanooga, Tenn.—Tom Fritts Hardware Co. will erect warehouse; 100x30 feet; plate-glass windows. (Recently mentioned.)

Celina, Texas.—Farmers Union Warehouse Co., recently reported incorporated, erected corrugated-iron warehouse at cost of $1500; will purchase and install machinery. (See "Machinery wanted.")

Pittsburg, Texas.—Camp County Farmers' Warehouse Co. incorporated by J. C. Porter, F. M. Reeves, J. N. Quillen and others.

RAILROAD CONSTRUCTION

RAILWAYS

Abilene, Texas.—R. M. Dunham of Coppage & Dunham, Fort Worth, Texas, has, it is reported, been investigating for a proposed railroad between Abilene, Brady and Comfort, Texas. Foreign capital is said to be interested. The line altogether would be about 250 miles long.

Ballinger, Texas.—The charter of the Ballinger & Abilene Railway Co. has been approved to build a line from Ballinger to Abilene, Texas, 53 miles; capital $250,000; headquarters at Ballinger. The incorporators are C. A. Doose, C. H. Willingham, J. J. Guion, J. McGregor, J. W. Bowell, W. J. Miller, W. E. Allen, Tom Ward, J. O. Wilmeth and C. O. Harris of Ballinger, Cicero Smith and R. K. Wiley of Mineral Wells, Texas.

Ballinger, Texas.—President C. A. Doose of the Ballinger & Abilene Railroad Co. writes the Manufacturers' Record confirming the report that the company has been chartered to build a line 53 miles long from Ballinger to Abilene, Texas. The other officers are John I. Guion, first vice-president; J. W. Powell, second vice-president; Tom Ward, third vice-president; J. McGregor, secretary; Jo Wilmeth, treasurer; W. J. McDaniel, chief engineer and general manager; C. O. Harris, general attorney. C. H. Willingham, W. J. Miller and W. E. Allen of Ballinger and Cicero Smith and R. K. Wylie of Mineral Wells are also among the incorporators.

Bartlesville, Okla.—Work is reported to be actively progressing on the Bartlesville-Dewey Interurban Railway and it is expected to be finished within a few weeks. The line is five miles long. W. G. Thumel, chief engineer, is reported as saying that half the grade is completed. Bids for tracklaying will shortly be asked. The Bartlesville Interurban Railway Co. is the name of the enterprise.

Dallas, Texas.—S. A. Stemmons, secretary of the Dallas Interurban Electric Railway Co., which proposes to build a line from Dallas via Orphans' Home, Forney and Mesquite to Terrell, Texas, is reported as saying that work on the line will begin soon after January 1, construction being started simultaneously at Dallas and Terrell. Later there will be an extension to Tyler, Texas. The company also proposes another line from Dallas via Rockwall to Greenville, with a connection to Terrell, making a loop. The company has 23 miles of franchises in Dallas, as well as right of way for interurban lines.

Eldorado Springs, Mo. — The Eldorado Springs, Tiffin, Monegaw Springs & Lowry City Railroad Co. has done only preliminary work, and survey is not made. John S. Harrison is secretary and general manager, at Tiffin, Mo.

Eldorado, Okla.—The Oklahoma Southern Railway Co., with headquarters at Eldorado, has been chartered with $7,500,000 capital to build a line from the intersection of Grayson county, Texas, with the Red river through eight counties to the west line of Greer county, Oklahoma, 250 miles. The Farmers & Merchants' Railway Co. has also been chartered by the same people to build from the north line of Hardeman county, Texas, to the north line of Harper county, Oklahoma, about 200 miles; capital $6,000,000. The incorporators are H. W. Morris and C. B. Holiman, Eldorado, Okla.; W. G. Crowder, L. Simpson and M. M. Hawkins, Quanah, Texas.

Groveton, Texas.—P. A. McCarthy, chief engineer, informs the Manufacturers' Record that the Trinity County Lumber Co.'s railroad has grading nearly completed between Groveton and Bilx, Texas, 23 miles, and track will be laid thereon by March 1. From Bilx to Lufkin, 13 miles, the Texas Southeastern track will be used.

Heidelberg, Ky.—The Louisville & Atlantic Railroad is reported to have practically finished grading on its four-mile extension from Heidelberg to coal mines along Sturgeon creek in Owsley county. Ties and rails are received, and it is expected to be in operation by April 1.

Henderson, Ky.—The Evansville & Henderson Railway Co. is reported to have amended its charter, fixing capital at $100,000 and funded debt at $500,000, this being done, it is said, to advance the construction.

Houston, Texas.—Reported that the Missouri, Kansas & Texas Railway proposes to improve the Houston division, making revisions of line and reductions of grades. J. W. Petheram is chief engineer, at Dallas, Texas.

Indianola, Miss.—The Manufacturers' Record is informed that E. N. Case & Sons of Dothan, W. Va., have purchased through M. T. Banta & Co. of Jackson, Miss., a large tract of timber land in this (Sunflower) county and will develop it, also building seven miles of steel railroad.

Meridian, Miss. — Concerning the report that the New Orleans & Northeastern Railroad Co. would build a mile and a half change of line at Meridian, an official informs the Manufacturers' Record that no cutoff is planned and, in fact, no material change is practicable there.

Mobile, Ala.—An official of the Mobile, Jackson & Kansas City Railroad is quoted as confirming the report from New York that a new company, called the New Orleans, Mobile and Chicago Railroad Co., has been formed to take over the property of the road and to extend it both north and south, the latter to New Orleans and the former to a point on or beyond the Ohio River. The New Orleans extension will hardly be made until about two years have elapsed. L. S. Berg is president and H. S. Jones is chief engineer.

Monroe, La.—The Arkansas, Louisiana & Gulf Railroad Co. is reported to have filed a mortgage to secure $6,000,000 of 5 per cent. 50-year bonds for construction purposes. J. M. Parker is general manager at Monroe, La.

Onancock, Va.—The Accomac Traction & Power Co. has, it is reported, approved a contract with James D. Lalor & Co. for building its proposed line from Onancock via Tasley and Accomac Courthouse to Battle Point. It is proposed to sell $175,000 of 5 per cent. bonds, the proceeds of which are to be used for constructing the road. S. F. Rogers is president and T. W. Taylor is secretary.

Port Arthur, Texas.—Moses Falkenberg, chief engineer, and R. L. Andrews of Andrews & Son are quoted as saying that the Port Arthur & Houston Short Line has been financed and they are ready to start work.

Salisaw, Okla.—The St. Louis, Springfield & Oklahoma Western Railway Co. is reported to have awarded construction contract to the Cullen Construction Co. of Newark, N. J., and that Samuel H. Wandell of New York has formed a syndicate to finance the project; construction is to begin February 1, the line to run from Salisaw to Lawton, Okla., about 250 miles.

Sapulpa, Okla.—The Sapulpa & Interurban Electric Railway Co., it is reported, will begin construction January 1. Rails have been received.

Shelbyville, Mo.—The Shelby County Railroad, eight miles long, from Shelbina to Shelbyville, has been put in operation.

Texarkana, Texas.—John T. Upchurch of Longfellow, Texas, it is reported, represents capitalists who propose to build an elect ic railway from Texarkana to Fort Worth, Texas.

Victoria, Texas.—The Manufacturers' Record is officially informed that the Port O'Connor, Rio Grande & Northern Railway Co. expects to begin tracklaying between Port O'Connor and Yoakum, Texas, 90 miles, in January, the grade having been repaired and put in first-class condition. It is also expected to begin construction early in 1908 from Yoakum north to Smithville and San Antonio, Texas. W. I. Allen is vice-president and general manager, and L. A. Gueringer is chief engineer, both at Victoria, Texas.

Washington, D. C.—The Washington, Westminster & Gettysburg Railroad Co. has organized. It proposes to build a line 60 miles long from Washington via Sandy Springs and Westminster, Md., to Gettysburg, Pa. Capitalists in New York, Philadelphia, Pittsburg and other cities are said to be back of the plan. The officers are J. B. Colgrove of Washington, president; Edwin F. Thomas of Sandy Springs, Md., vice-president; A. A. Chapin of Washington, second vice-president; Walter Atlee of Baltimore, chief engineer.

STREET RAILWAYS

Amarillo, Texas. — The Amarillo Street Railroad Co. is reported to have laid 11 miles of track and the line is being rapidly completed. Service is to begin soon.

Ardmore, Okla.—Construction on the street railway, it is announced, will begin by January 1 and will be rushed until completed. Ira L. Reeves of Muskogee and others are reported interested. J. R. Yarbrough is superintendent of construction.

Birmingham, Ala.—The Birmingham Railway, Light & Power Co. will, it is reported, spend about $300,000 in 1908 for improvements.

Grafton, W. Va.—The Grafton Traction Co. has completed its street railway and is now finishing its power plant for the purpose of beginning service soon.

Knoxville, Tenn.—Having completed their work for the Knoxville Railway & Light Co., Ford, Bacon & Davis, construction engineers, have, it is announced, closed their offices in Nashville. Headquarters are in New York.

MACHINERY, PROPOSALS AND SUPPLIES WANTED

Manufacturers and others in need of machinery of any kind are requested to consult our advertising columns, and if they cannot find just what they wish, if they will send us particulars as to the kind of machinery needed we will make their wants known free of cost, and in this way secure the attention of machinery manufacturers throughout the country. The Manufacturers' Record has received during the week the following particulars as to machinery that is wanted.

Antitoxic Devices.—See "Smoking Devices."

Art Glass.—J. W. Callahan, chairman building committee, Bainbridge, Ga., wants prices on art glass for $25,000 church building.

Asbestos, etc.—Mario Rolla, No. 9 Via Galto, Turin, Italy, is prepared to handle asbestos, cacao, kaolin, oils, charcoal, etc.

Bells.—See "Steamboat Supplies."

Boiler.—J. L. McKamry, Imboden, Ark., wants 40-horse-power boiler.

Boiler.—D. L. Rush, secretary Meadville Light & Power Co., Henderson, Tenn., wants 80-horse-power boiler; address after February 1, Meadville, Miss.

Bridge Construction. — Cumberland River Bridge Committee of Davidson county, Cole Building, Nashville, Tenn., will open bids January 22 for following steel bridge work: Furnishing all materials and the manufacture and erection of steel spans listed below: Four spans deck plate girders, 53 feet 2 inches center to center of bearings; one span deck plate girder, 70 feet center to center of bearings; two rolled I-beam spans; four through truss spans, 175 feet center to center end pins; one deck truss, 98 feet 7 inches center to center end pins; two 318-foot through truss spans. These spans are to be erected in two bridges across Cumberland river in Nashville, Tenn; to be extra heavy highway structures; tonnage required will be about 3000 tons; certified check, $5000, payable to order of County Trustee of Davidson county; where only portion of work is bid on, certified check 3 per cent. of amount of bid required; usual rights reserved; plans and specifications for work on file at office of committee, or will be mailed on receipt of $10; J. K. Rains, chairman of committee; H. M. Jones, engineer.

Bridge Construction.—Police Jury of Rapides parish, Alexandria, La., will open bids January 16 for construction of steel highway bridge on concrete piers at the racetrack crossing at Bayou Rapides; certified check $500; bond in sum of 20 per cent. of contract price; usual rights reserved. For copies of plans and specifications address Ira W. Sylvester, consulting engineer, Rapides Bank Building, Alexandria, La.

Bronze Bearings.—Mertens & Marchal, 24 Rue Sterckx, Brussels, Belgium, wants to correspond with manufacturers of bronze (not babbitt) self-oiling and anti-friction bearings, including shaft, brasses and journal.

Broom Machinery.—Union Broom Co., W. H. Gatling, manager, Salado, Ark., will buy broom machinery.

Bridges.—Lincoln County Commissioners, Troy, Mo., will receive bids until February 13 for construction of bridge to be erected by Lincoln and St. Charles counties; steel structure; main span 198 feet long, resting on tubular piers, with two 18-foot approaches resting on steel legs with concrete backing.

Bridges. — Nashville Interurban Railway, Nashville, Tenn., wants prices on second-hand bridges; about 50-foot spans.

Brine Pumps.—See "Pumps."

Building Materials.—Black & Coulter Company, Columbia, S. C., wants prices on building materials, including steel I beams, columns, terra-cotta ornamentation, etc.

Building Materials.—Burett H. Stephens, 406 Southern Building, Wilmington, N. C., wants samples and descriptive literature of building materials and supplies.

Carpet Cleaner.—See "Vacuum Cleaning Machine."

Cement-block Machinery.—Gatesville Realty Co., Crystal Springs, Miss., will need machines for making cement blocks.

Concrete Mixer.—John Houchin, Jackson, Miss., wants prices on concrete mixer.

Cleaning Machinery.—Henry W. Epstein, 1100 Grayson street, Louisville, Ky., is in market for cleaning and dyeing machinery.

Columns.—Black & Coulter Company, Columbia, S. C., wants prices on columns for three-story brick building.

Concrete Machinery.—Granite Stone Co., Hazlehurst, Ga., wants column mold.

Concrete Reservoir.—Bids will be opened January 24 for constructing a 200,000-gallon reinforced concrete reservoir at Fort Barrancas, Fla.; U. S. reserves usual rights; information on application; Lieut. A. L. Rhoades, Quartermaster.

Construction Work.—Bids will be opened January 25 at U. S. Engineer Office, Wheeling, W. Va., for constructing guide walls, grading, paving, etc., at dam No. 13, Ohio river; information on application; F. C. Boggs, Captain, Engineers.

Conveying Equipment.—D. W. Taylor, secretary, Farmers' Union Warehouse Co., Celina, Texas, wants prices on machinery for moving cotton in warehouse.

Cooperage Stock.—D. L. Jennings, Spartanburg, S. C., wants addresses of manufacturers of cooperage stock—staves, hoops, heading.

Corn Mill.—Organ & Kittrell Bros., Pleasant Shade, Tenn., will want corn mill complete, with sifter, etc.

Corrugated Iron.—See "Iron."

Drainage Construction.—Drainage Commissioners of Leflore county, Greenwood, Miss., will award contract involving removal of about 240,000 cubic yards of dirt.

Drainage Machine.—Commissioners of Leflore county, Greenwood, Miss., want prices on drainage machines and similar equipment and supplies.

Dredging.—Bids will be received until January 29 at Engineer Office, U. S. Army, Custom-house, Norfolk, Va., for dredging harbor at Cape Charles, Va.; information on application; Joseph E. Kuhn, Major, Engineers.

Drilling Outfits.—H. J. Francez, secretary, Carenco Oil Co., Crowley, La., wants prices on drilling outfits.

Dyeing Machinery.—Henry W. Epstein, 1100 Grayson street, Louisville, Ky., is in market for dyeing and cleaning machinery.

Electrical Appliances.—Gonder & Birch Company, Elm Grove, W. Va., wants catalogues of electrical appliances.

Electrical Equipment.—See "Machinery and Supplies."

Electrical Equipment.—Standard School Desk Manufacturing Co., Columbus, Ga., will want electrical equipment for about 150-16 candle machine, electricty to be generated by steam power.

Electrical Equipment. — J. W. Callahan, chairman building committee, Bainbridge, Ga., wants bids on motor for pipe organ.

Electrical Machinery.—D. L. Rush, secretary Meadville Light & Power Co., Henderson, Tenn., wants two 30-kilowatt 220-volt direct-current dynamos, also three-wire switchboard; address after February 1, Meadville, Miss.

Electric Fixtures.—J. W. Callahan, chairman building committee, Bainbridge, Ga., wants prices on electric fixtures for $25,000 church.

Elevator.—S. J. Bartlett, 779 West Elm street, Springfield, Mo., wants estimates on electrical automatic passenger elevator; outside size 5½x7½ feet, length of shaft about 54 feet.

Engine.—D. L. Rush, secretary Meadville Light & Power Co., Henderson, Tenn., wants 65-horse-power automatic engine; address after February 1, Meadville, Miss.

Engine.—High Point Bending & Chair Co., Siler City, N. C., wants 50-horse-power slide-valve side-crank engine (Buckeye engine preferred).

Excelsior Buyers and Manufacturers.—John Craft, Mobile, Ala., wants addresses of excelsior manufacturers and buyers.

Engine.—See "Machinery and Supplies."

Engine.—J. L. McKamry, Imboden, Ark., wants 25 to 35-horse-power plain slide-valve engine.

Excavating Machinery.—See "Plowing Machinery."

Excelsior Machinery.—John Craft, Mobile, Ala., wants addresses of makers of excelsior machinery.

Filing Cabinets.—C. G. Sayre, Payne Building, Anderson, S. C., wants catalogues and prices on patent record filing cabinets.

Fire Engine.—John N. England, City Clerk, Demorest, Ga., wants new or second-hand fire engine, 8 to 12-man power.

Fireproof Apparatus.—C. G. Sayre, Payne Building, Anderson, S. C., wants catalogues and prices on fireproof apparatus.

Gasoline Pumping Engines.—See "Pumping Engines."

Ginning Outfit. — Gatesville Realty Co., Crystal Springs, Miss., will want ginning outfit.

Heating Plant, etc.—B. W. Torreyson, Conway, Ark., secretary Board of School Trustees of Little Rock, Ark., will open bids January 15 for heating, plumbing and wiring in normal-school building to be erected at Conway. (See item under "Schools," Conway, Ark.)

Ice Plant—Wesson Light and Power Co., Wesson, Miss., wants five-ton ice plant, second-hand; state full particulars, including price f. o. b. point of shipment.

Iron.—Union Point Lumber Co., Newbern, N. C., wants about 30,000 square feet 28-inch-gauge galvanized iron; quote on plain 30 inches wide and corrugated 26 inches wide; for building purposes.

Iron Castings.—P. J. Schelb, 315 East Tucker street, Fort Worth, Texas, in market for small iron castings finished in oxydized copper, in quantities by thousand; weight of casting about two and a-half pounds.

Laundry Machinery.—Columbus Brick Co., Columbus, Miss., wants new or second-hand laundry equipment for family laundering on large scale.

Locomotive.—J. H. Macleary, Suffolk, Va., in market for one 10 or 12-ton second-hand 42-inch-gauge locomotive; American type preferred; state where inspection can be made.

Lumber.—Amity Telephone Co., J. T. Goodman, manager, R. F. D. No. 2, Box 60, Mt. Ulla, N. C., will want telephone poles.

Lumber.—High Point Bending & Chair Co., Siler City, N. C., wants hardwood lumber for short stock stuff.

Lumber.—Georgia Creosoting Co., Ficklin, Ga., wants lowest prices (f. o. b. Ficklin) on yellow pine of following dimensions: 3"x 8", any length from 8' to 20', 85 per cent. heart; 3¼"x4¼"x16', 75 per cent. heart; 3¼"x4¼"x16', 100 per cent. heart; all lumber to be perfectly sound and free from loose or rotten knots; will want about 1,000,000 feet in spring months.

Machine Tools.—See "Splitting Shears."

Machine Tools.—Gonder & Birch Company, Elm Grove, W. Va., wants catalogues of machinery and tools.

Machinery and Supplies.—Bids will be received at office of H. F. Hodges, general purchasing officer, Isthminan Canal Commission, Washington, D. C., until January 20 for furnishing engine and generator, engine-driven exciter, storage battery, incandescent globes, hydrometers, sand pumps, pump governors, valve reseating machine, hoisting block, blacksmiths' tools, steel, iron, iron locks and lift pins for car couplers, pump valves, etc. Blanks and general information relating to Circular No. 412 obtained from above office or assistant purchasing agents, 24 State street, New York; Custom-house, New Orleans; 1086 North Point street, San Francisco, Cal., and 410 Chamber of Commerce Building, Tacoma, Wash.; also from Chief Quartermaster, Chicago; Depot Quartermaster, St. Louis; Depot Quartermaster, Jeffersonville, Ind., and Chief Quartermaster, Atlanta, Ga., and United States Engineer Office in following cities: Los Angeles, Cal.; Baltimore, Philadelphia, Pittsburg, Boston, Buffalo, Cleveland, Cincinnati, St. Paul, Detroit, Milwaukee, Chicago, St. Louis, Chattanooga, Louisville and Mobile.

Metal Ceiling.—Glenn Bros., Hugo, Okla., in

market for metal ceiling delivered at Sayre, Okla.

Metal-working Machinery.—See "Tin-shingle Machinery."

Naval Supplies.—Bids will be received until January 7 at Bureau of Supplies and Accounts, Navy Department, Washington, D. C., to furnish at navy yard, Washington, D. C., a quantity of naval supplies. Schedule 625, pipe threading machine; Schedule 647, sheet copper and lead, bronze. Applications for proposals should designate schedule desired by number. Blank proposals will be furnished upon application to Bureau. E. B. Rogers, Paymaster-General U. S. N.

Naval Supplies.—See "Steamboat Supplies."

Oil-mill Machinery.—J. H. Meyer, Houston, Texas, wants estimates on cotton-oil machinery.

Paper-manufacturing Materials. — Mario Rolla, No. 9 Via Gaito, Turin, Italy, is prepared to handle paper-manufacturing materials.

Paving.—Ennis M. Douglass, City Register, Memphis, Tenn., will open bids January 8 for furnishing all labor and materials and paving Mississippi boulevard from Iowa avenue southward as far as $10,000—the amount appropriated—will carry the work. From Iowa avenue to Walker avenue pavement will be vitrified brick on concrete foundation, and south of Walker avenue cementing gravel, with brick gutters, granite curbing having already been ordered; plans and specifications on file at office of City Engineer; certified check $250, payable to city of Memphis; usual rights reserved. James H. Malone, Mayor.

Pipe Organ. — J. W. Callahan, chairman building committee, Bainbridge, Ga., wants bids on pipe organ.

Piping.—Ice Utilities Manufacturing Co., Carbon Hill, Ala., wants 1000 feet one-and-one-half-inch galvanized piping.

Piping.—Standard School Desk Manufacturing Co., Columbus, Ga., wants 3000 feet one-inch wrought-iron pipe and 1000 feet of three-quarter-inch.

Piping.—Second-Hand Pipe & Supply Co., Avery and 3d streets, Parkersburg, W. Va., in market for 500 feet 17-pound 6¼-inch 11½-thread casing, second-hand, for immediate shipment.

Plowing Machinery.—J. D. Strickland, Stilson, Ga., wants machine that will clear and prepare new land, cut up and take out large roots and break hard-packed ground.

Plumbing.—See "Heating."

Plumbing.—J. W. Callahan, chairman building committee, Bainbridge, Ga., wants bids on plumbing for $25,000 church building.

Polishes. — Battey Machinery Co., Rome, Ga., wants addresses of manufacturers of good metal and brass polish. (Title of company erroneously stated in previous notice.)

Pump. — Ice Utilities Manufacturing Co., Carbon Hill, Ala., wants brine pumps, boiler-feed pumps, 6x4x6, to feed 200-horse-power boilers with hot water from condenser pipe of 10-ton ice plant.

Pumping Engines.—Leete-Maupin Engineering Co., First National Bank Building, Huntington, W. Va., wants to correspond with manufacturers and agents of gas or gasoline pumping engines.

Pumps.—G. P. Altenberg, Box 337, Cincinnati, Ohio, is in market for vacuum pumps such as are used in manufacture of incandescent lamps.

Rails. — Nashville Interurban Railway, Nashville, Tenn., wants prices on 70-pound rails, new and relaying.

Railway Equipment.—See "Locomotive."

Roofing.—High Point Bending & Chair Co., Siler City, N. C., wants V-crimp roofing.

Roofing.—Standard School Desk Manufacturing Co., Columbus, Ga., wants 150 squares of roofing.

Roofing.—Glenn Bros., Hugo, Okla., in market for roofing delivered at Sayre, Okla.

Scales.—D. W. Taylor, secretary, Farmers' Union Warehouse Co., Celina, Texas, wants prices on scales for cotton warehouse.

Seating.—J. W. Callahan, chairman building committee, Bainbridge, Ga., wants prices on circular pews.

Sewer Systems.—See "Water-works" item mentioning O'Neil Engineering Co.

Siding.—See "Iron."

Smoking Devices.—J. C. Darst, Portsmouth, Va., wants to correspond with manufacturers of devices for making cigarettes anti-toxic.

Splitting Shears.—D. L. Casey Machine Co., Springfield, Ohio, wants splitting shears; power-driven; capacity of splitting half-inch plate; must be cheap for cash; send maker's cut.

Steambont Supplies.—Southport Supply Co., Southport, N. C., wants to buy equipments consisting of air whistle, foghorn, signal lights, life preservers, and fog bell not less than eight inches in diameter.

Steam-power Plant.—J. H. Meyer, Houston, Texas, wants estimates on steam power for cotton-oil mill.

Steel Beams.—Black & Coulter Company, Columbia, S. C., wants prices on steel I beams.

Steel Cages.—C. G. Sayre, Payne Building, Anderson, S. C., wants catalogues and prices on steel cages for courthouse and school building.

Structural Materials. — Gonder & Birch Company, Elm Grove, W. Va., wants catalogues of structural materials.

Stump Pullers.—See "Plowing Machinery."

Telephone Equipment. — Amity Telephone Co., J. T. Goodman, manager, R. F. D. No. 2, Box 60, Mt. Ulla, N. C., will want telephone instruments, insulators, wires, crossarms, poles, etc.

Terra-Cotta.—Black & Coulter Company, S. C., wants prices on ornamental terra-cotta.

Tin-shingle Machinery.—John T. Burriss & Son, Anderson, S. C., want information and prices on machines for making tin shingles.

Trucks.—Standard School Desk Manufacturing Co., Columbus, Ga., wants 40 2x5 mill trucks.

Vacuum Cleaning Machines.—John G. Duncan Company, 308 West Jackson avenue, Knoxville, Tenn., wants portable machine for cleaning carpets on floor by compressed air.

Vacuum Pumps.—See "Pumps."

Vault.—C. G. Sayre, Payne Building, Anderson, S. C., wants catalogues and prices on vault fixtures.

Water-works.—O'Neil Engineering Co., Dallas, Texas, will receive bids in January for machinery and materials for $40,000 water-works at Homer, La.; $67,000 water-works and sewerage improvements at Okmulgee, Okla.; $20,000 water-works and sewer system at Elk City, Okla., and $20,000 sewer system at Bonham, Texas.

Water-works.—G. L. Baltzell, City Clerk, Fernandina, Fla., will open bids January 15 for furnishing material and laying water main from Center street to Old Town. Specifications can be obtained on application to City Clerk.

Wiring.—See "Heating."

Woodworking Machinery. — High Point Bending & Chair Co., Siler City, N. C., wants woodworking machinery.

Woodworking Machinery. — Ice Utilities Manufacturing Co., Carbon Hill, Ala., wants woodworking machinery.

Woodworking Machinery.—Standard School Desk Manufacturing Co., Columbus, Ga., wants 36-inch band saw, self-feed rip saw, 9-inch four-sided molder, 18-inch joiner, 30-inch cabinet planer, 24-inch pony planer, double-spindle shaper, iron frame, and dado saw, 10 feet.

Wrenches.—Oaks Manufacturing Co., Newbern, N. C., wants addresses of manufacturers of wrenches suitable for use with farm implements.

INDUSTRIAL NEWS OF INTEREST

Machinery for Sale.

A Baltimore dealer is at present offering for sale a lot of machinery that will interest contractors and power-machinery users. The stock includes two steam shovels, concrete mixers, cars, boilers, derricks, etc. For particulars address Benjamin F. Cator, 600 Maryland Trust Building, Baltimore, Md.

The Coltay Mining Spad.

Recently attention was called to the Coltay mining spad, a specialty used by mining engineers. The Smith-Courtney Company of Richmond, Va., the well-known dealer in machinery and supplies, is the owner of this device, and has been actively promoting its sale for a year. The spad is furnished both in sheet steel and non-corrosive metal.

Ford Company Is Busy.

The C. B. Ford Company, founder and machinist, Richmond, Va., is not one of the largest industries in the South, but the way in which business continues at its plant affords evidence of the fact that the country's needs have by no means been filled. Last week the company averaged one full carload of special work every day to out-of-town customers, and from the number of orders now being received the company sees no reason to fear a general depression over the country.

Modern Construction Materials.

The large demand for modern construction materials throughout the South is being given attention not only by manufacturers and dealers of the North, East and West, but also by Southern firms. Among the latter is Messrs. Wainwright, Jackson & Co. of Norfolk, Va. They are prepared to send samples, submit prices and make prompt deliveries on pressed brick, terra-cotta, Portland cement, wall plaster, lime, slate, roofing tile, partition tile, reinforced bars, expanded metal, steel lath, corner beads, paint, mortar color and other products.

Combination Locomotive and Passenger Car.

One of the interesting exhibits at the Jamestown Exposition was the combination locomotive and passenger car shown by Jos. E. Bowen, Bank of Commerce Building, Norfolk, Va. The locomotive has attracted favorable attention in the railroad and lumber world. The exhibit was sold, together with passenger, baggage and flat cars, to the Due West (S. C.) Railroad. The locomotive left under its own steam via Southern Railway for Due West, 480 miles distant, in charge of C. W. Bowen, expert engineer and traveling representative of Jos. E. Bowen. Jos. E. Bowen, being special representative of the Vulcan Locomotive Works of Wilkes-Barre, Pa., has given instructions for advertising literature to be distributed en route. The literature will refer to Vulcan products and to the Norport Car & Locomotive Works (on the Belt Line, Portsmouth, Va.), making a specialty of repairing locomotives and cars, and Mr. Bowen is largely interested in the plant. This young enterprise is under the management of F. T. Beazley, ex-passenger engineer of the A. C. L. R. R.

Assisting to Encourage Industry.

This is a time when the optimistic manufacturer has excellent opportunity to assist in encouraging a return to general activity in manufacturing which prevailed until recently and will soon again prevail. The Savage Mountain Fire-Brick Co. of Frostburg, Md., is one of the optimistic ones. This company admits that orders are not quite so plentiful as they were up to several weeks ago, but it adds that it has no intention of lessening operations, as it believes early in the new year demands for its brand of fire-brick will be largely in excess of output. For 43 years the company has been making high-grade fire-brick, with a specialty of rolling mill, forge, steel, malleable, hearth and bosh of blast furnace.

The Cement Machinery Co.

An announcement regarding the Cement Machinery Co. of Jackson, Mich., is of interest to all who are concerned in the use of machinery for making concrete blocks and other shapes for construction purposes. It is that Messrs. Sid L. Wiltse and J. C. Lautenslager have purchased the Cement Machinery Co., with its plants, patents and other privileges, in connection with the Normandin and other inventions. The new owners have been with the company for several years past, Mr. Wiltse having been secretary and sales manager since the establishment of the enterprise. Under the new ownership the company will continue its activities in making and improving concrete-products machinery, its designs being now used not only in the United States, but in foreign countries. This is evidenced in the statement that since November 1 the company has shipped machinery to Cuba, Brazil and Mexico. The Cement Machinery Co. has its Eastern branch and export office at 29 Broadway, New York. It may also be added that Messrs. Wiltse and Lautenslager compose a new corporation, the Peninsular Cement Stone & Construction Co., which will manufacture concrete products and undertake all kinds of concrete construction work in Ohio.

Burett H. Stephens, Architect and Engineer.

Announcement is made that Burett H. Stephens of Chicago has located permanently in Wilmington, N. C., for the practice of his profession—architecture and general engineering. He has established offices at 406 Southern Building, and is prepared to consult regarding the planning and construction of industrial plants to be arranged and equipped in the best possible way for efficient and economical production. Mr. Stephens has had considerable experience in his chosen field of activity, having been connected with D. H. Burnham & Co. of Chicago, Sheppely, Rutan & Coolidge of Boston, American Bridge Co. at Chicago and various others of importance in the industrial world. He had charge of building the big new fertilizer plant of the Swift interests near Wilmington, also the oil refinery at Charlotte. Believing that the Southern field offers an excellent oportunity for expert knowledge and practice in architecture and engineering, Mr. Stephens has located in Wilmington, as above stated, and now invites investigation of his facilities. He also asks manufacturers of building material and supplies to send samples and explanatory literature.

Opportunities for Young Men.

"When one is heard to complain these days of a lack of opportunity for the young man it causes the employer and the man of affairs to growl, for to him there is no problem greater than that met in the effort to get young men equipped to learn the rudiments of a business and then develop." An officer of the General Fireproofing Co. of Youngstown, Ohio, in discussing this question stated that his enterprise is now in need of several young men with ability and the experience that would have come to them through a connection with their company or a manufacturer of a similar line, and that during the past year there had been no time when they could not have started a young man in some capacity. "His statements along this line would indicate that that concern in its development is offering desirable opportunities for young men, and the same may be said for other concerns of the city which are growing fast and need young men who can be pushed along into the positions of responsibility. The industrious, sincere young man with initiative may even in these days, fraught with uncertainty, go where he will, and our own industrial concerns here offer the best example of this. The General Fireproofing Co. has set a pace in this matter, and young men, ambitious and with a willingness to work, are given ample opportunity for advancement by this company. The plant of the company is working practically on full time now, and the financial stringency, which has passed, seems to have had not the slightest effect upon its business."

A Letter About Fire Brick.

Users of fire brick will be interested in the following copy of a letter from the Canton Iron & Steel Co. of Baltimore to the Savage Mountain Fire Brick Co. of Frostburg, Md.: "The Savage Mountain fire brick is superior to any other we have used recently. We find in the roofs of the furnaces that Savage Mountain fire bricks will burn down to an inch and a half before the arch of the roof will give away. Our experience has been with all other bricks that they will break and drop out of the roof, or else will run, which shows that they are not made of the kind of clay which will resist the action of the heat. We have also found that Savage Mountain fire bricks are more uniformly made and burnt than the bricks which we have been using. We have had quite a little trouble with the irregular shapes and sizes from nearly all the brickmakers from whom we have in the past bought. We have also found many of their bricks warped, and I am able to tell you that thus far we have failed to find any of this kind in Savage Mountain bricks, and we feel safe in saying that we have found Savage Mountain fire bricks to be the best brick that we know of for rolling-mill furnaces. We might add that the work to which bricks are subjected in the rolling mills is probably the hardest test which they are asked to stand, because of the constant changes in the heat of the furnaces; and for grate-cleaning time we play water in the fire chambers in order to break up the clinkers which form on the grate, and we feel sure that this has a trying effect on the bricks."

Typewritten Business Letters.

Among the new adjuncts to the modern business man's operations is the new kind of typewritten personal letters, produced by recently invented typewriting machines. The impression is made through a ribbon just the same as on the ordinary typewriter. When the name and address is filled in on the typewriter with a ribbon which matches the letter, and a personally written signature is affixed to the bottom, the most expert business man could not distinguish these multi-copy letters from the average letter produced on the standard typewriter machines. The Multi-Copy Business Letter Co., Union Trust Building, Washington, D. C., has a modern plant for printing and mailing letters, using this modern process. Special attention is paid to getting up "follow-up" letters and "system" letters for use

in various kinds of enterprise. This company is emphasizing the importance of care and skill in preparing the letters. It claims that letters should in terms and form convey a specific proposition, which directly invites an answer and which is couched in the most winning and attractive language possible to suggest. The reason that so many people fail in getting results is because the letter does not contain anything in the shape of a definite proposition for the recipient to respond to. The company believes in the principle of enclosing return postal cards, coupons or certificates, which represent something of value to the prospective customer and such other methods, according to circumstances, as will secure from the person addressed some reply, or the purchase of some article of value, however trifling. Business men are invited to investigate this new form of letter.

Penberthy Christmas Literature.

The timely articles in the Christmas number of the Penberthy Injector and Fireman include references to the assembling and adjusting of working parts of an engine, the pull of belts, reboring a gas-engine cylinder, the cause of scale and how to get rid of it, and various others. Illustrations and diagrams assist in making the text entirely clear to the reader. The Penberthy Injector Co. of Detroit, Mich., publishes the monthly.

Saws That Cut Steel Bars.

A Southern county which contracted for the erection of a jail containing steel cells had occasion to test the work recently. The building contains three steel cages, which were to be proof against cutting in any manner and with any tool. An endeavor to cut the bars was made with regular stock saws taken from the store of a local hardware dealer and was successful. Now, the interesting feature is what make of saw cut the steel, and it is announced it is the saw manufactured by the L. S. Starrett Company of Athol, Mass., well known everywhere for its hack and other saws.

The "Monitor" Pump.

The Canton-Hughes Pump Co. of Canton, Ohio, calls attention to the Monitor duplex boiler-feed and general-service pump, stating that there has been no departure made in the construction of boiler-feed pumps for years until the Monitor was placed on the market. The company says: "The absence of all outside gearing, such as lever stands, rocker arms, crossheads, etc., does away, to a great extent, with the expensive repairs always required for the maintenance of the old types of duplex pumps. There are already several thousands of the Monitor pumps in use, and it has given such general satisfaction that it has become known in the trade as 'the repairless pump.' Additional information can be secured by writing to us."

Gas Engine and Producer Test.

A careful service and economy test of the 250-horse-power Weber gas engine and suction gas producer installed in the plant of the McClary Manufacturing Co., London, Ontario, demonstrated that it surpassed the guarantee called for in the contract. In regular operation less than .95 of a pound of coal per B. H. P. hour is used. The total cost for generating power, including fuel, labor, supplies, depreciation and interest on the investment, shows a profit over what the company could purchase energy from the Niagara Falls power companies. The Weber Gas Engine Co. of Kansas City, Mo., builds the Weber machinery and is now installing several 350-horse-power gas-power plants in cotton mills, electric-light plants and flour mills, as well as a number of smaller units.

For Oil-Mill Operators.

The following statement will interest oil-mill operators: "It must be gratifying to oil-mill operators to know that loss in separation can be reduced to considerably less than 1 per cent. Operators can be given names and addresses of oil-mill managers who will confirm this statement, simply because they have eliminated the losses they formerly sustained. This problem should interest every oil-mill operator to the extent, at least, of investigating it. To be sure, it will require the necessary apparatus to do the work. But what of that if within a single running season the saving will more than pay for the new machinery." The Foos Manufacturing Co., Springfield, Ohio, guarantees that its scientific cottonseed-oil machinery will reduce loss in separation to less than 1 per cent.. The company is willing to answer questions relative to any problem that confronts the oil-mill management. The Foos Manufacturing Co. makes grinding mills—or attrition mills—for every purpose.

FINANCIAL NEWS

Review of the Baltimore Market.

Office MANUFACTURERS' RECORD,
Baltimore, Md., December 31.

The Baltimore stock market has been very dull during the past week. In the trading United Railways income bonds sold at 45¼; the funding 5s from 70¼ to 70¾; the funding scrip from 71 to 70; United 4s from 81 to 81¼; Gas 6s, 103½; do. 5s, 105; Seaboard 4s, 65 to 64¾; do. 10-year 5s, 91 to 91⅜; Maryland Casualty, 57 to 58.

Other securities were dealt in as follows: Northern Central Railway, 80½ to 82; Georgia & Alabama consolidated 5s, 98; Virginia deferred Brown Bros. certificates, 26; Western Maryland Railroad, 5¾ to 6; do. 4 per cent. bonds, 63 to 63⅞; Baltimore City 3½s, 1928, 95; do. do. 1930, 95 to 95½; do. do. 1940, 97½; City & Suburban (Baltimore) 5s, 105; West Virginia Central 6s, 103⅛; Charleston & Western Carolina 5s, 100; Georgia Southern & Florida 5s, 102; Georgia, Carolina & Northern 5s, 101; Richmond Traction 5s, 102½.

SECURITIES AT BALTIMORE.

Last Quotations for the Week Ended December 31, 1907.

Railroad Stocks.	Par.	Bid.	Asked.
Atlantic Coast Line of Conn.	100	...	320
Seaboard Company Common	100	8	9
Seaboard Company 1st Pfd.	100	50	...
United Rys. & Elec. Co.	50	9¾	...
Western Maryland	50	6	6⅞
Bank Stocks.			
Citizens' National Bank	10	...	34
Commercial & Farmers	100	...	110
Farmers & Mer. Nat. Bank	40	...	49
First National Bank	100	...	130
Maryland National Bank	20	15	16
Merchants' National Bank	100	160	172½
National Bank of Baltimore	100	110	118
National Exchange Bank	100	165	170
National Marine Bank	30	...	38
National Union Bank of Md.	100	110	...
Third National Bank	100	118	122½
Trust, Fidelity and Casualty Stocks.			
Maryland Casualty	25	57½	...
Title Guar. & Trust	..	...	125
Miscellaneous Stocks.			
Ala. Con. Coal & Iron Pfd.	100	...	75
Con. Cotton Duck Common	50	7	...
Con. Cotton Duck Pfd.	50	26	...
G.-B.-S. Brewing Co.	100	2	...
Georges Creek Coal	100	...	75
Railroad Bonds.			
Albany & Northern 5s, 1946		92½	95
Atlanta & Charlotte Ext. 4½s		95	...
Atlantic Coast Line 1st 4s, 1952		86½	88
Atlantic Coast Line 4s, Ctfs., 1952		65	...
Atlantic Coast Line (Conn.) 5s		95	...
Balto. & Harrisburg Ext. 5s, 1938		96	100
Carolina Central 4s, 1949		82	...
Charleston & West. Car. 5s, 1946		99½	102
Char., Col. & Aug. 1st 5s, 1910		98½	101
Columbia & Greenville 1st 6s, 1916		...	107
Georgia & Alabama 5s, 1945		97½	98¼
Georgia, Car. & North. 1st 5s, 1929		100	101
Georgia Pacific 1st 6s, 1922		109	...
Georgia Sou. & Fla. 1st 5s, 1945		102	102½
Maryland & Pennsylvania 4s, 1951		82	88
Piedmont & Cum. 1st 5s, 1911		...	100
Potomac Valley 1st 5s, 1941		...	105
Raleigh & Augusta 1st 6s, 1926		...	112
Richmond & Dan. Gold 6s, 1915		106	108
Savannah, Fla. & West. 5s, 1934		111	...
Seaboard Air Line 4s, 1950		...	64¾
Seaboard Air Line 5s, 10-year, 1911		90½	91¼
Washington Terminal 3½s		83¼	84
Western Maryland 4s, 1952		62½	63½
Western Maryland 2d 4s		46	47½
Western North Car. Con. 6s, 1914		102	107½
West Virginia Central 1st 6s, 1911		102¾	...
Wilmington, Col. & Aug. 6s, 1910		100½	...
Street Railway Bonds.			
Atlanta Con. Street Railway 5s		...	100¼
Baltimore Traction 1st 5s, 1929		105¾	...
Central Ry. Con. 5s (Balto.), 1932		105	...
Charleston City Rwy. 5s, 1923		...	104
City & Suburban 5s (Balto.), 1922		104	105¼
City & Suburban 5s (Wash.), 1948		...	97½
Lexington Railway 1st 5s, 1949		...	97
Metropolitan 5s (Wash.), 1925		104¾	...
North Baltimore 5s, 1942		106	107½
Richmond Traction 5s		100	102½
United Railways 1st 4s, 1949		81¼	81¾
United Railways Inc. 4s, 1949		45¼	45½
United Railways Funding 5s		70⅜	70¾
Miscellaneous Bonds.			
Consolidated Gas 6s, 1910		103½	...
Consolidated Gas 5s, 1939		104½	105
Con. Gas. El. Lt. & Power 4½s		70	72
G.-B.-S. Brewing 1sts		...	40
Baltimore Electric 1st 5s		70	80
G.-B.-S. Brewing 2d Inc.		13¼	14
Mt. Vernon-Woodb'y Cot. Duck 5s		63½	75

SOUTHERN COTTON-MILL STOCKS.

Quotations Furnished by Hugh MacRae & Co., Wilmington, N. C., for Week Ending December 28.

	Bid.	Asked.
Abbeville Cotton Mills (S. C.)	...	88
Aiken Mfg. Co. (S. C.)	...	90
American Spinning Co. (S. C.)	130	150
Anderson Cotton Mills (S. C.)	...	70
Arkwright Mills (S. C.)	...	110
Augusta Factory (Ga.)	...	77
Avondale Mills (Ala.)	...	130
Belton Mills (S. C.)	115	121
Bibb Mfg. Co. (Ga.)	...	113½
Brandon Cotton Mills (S. C.)	...	130
Cabarrus Cotton Mills (N. C.)	120	127
Chadwick Mfg. Co. (N. C.) Pfd.	...	103
Chiquola Mfg. Co. (S. C.)	121	130
Clifton Mfg. Co. (S. C.)	...	115
Clifton Mfg. Co. (S. C.) Pfd.	101	...
Clinton Cotton Mills (S. C.)	150	...
Columbus Mfg. Co. (Ga.)	96	98
Courtenay Mfg. Co. (S. C.)	...	97½
Dallas Mfg. Co. (Ala.)	96	100
Darlington Mfg. Co. (S. C.)	80	85
Eagle & Phenix Mills (Ga.)	125	137½
Easley Cotton Mills (S. C.)	145	150
Enoree Mfg. Co. (S. C.)	70	80
Enoree Mfg. Co. (S. C.) Pfd.	...	100
Enterprise Mfg. Co. (Ga.)	85	90
Exposition Cotton Mills (Ga.)	225	240
Gaffney Mfg. Co. (S. C.)	85	90
Gainesville Cotton Mills (Ga.)	50	60
Granby Cot. Mills (S. C.) 1st Pfd.	45	52
Graniteville Mfg. Co. (S. C.)	160	165
Greenwood Cotton Mills (S. C.)	97	98½
Grendel Mills (S. C.)	120	122½
Henrietta Mills (N. C.)	161	175
King Mfg. Co., John P. (Ga.)	...	98
Lancaster Cotton Mills (S. C.)	...	98
Lancaster Cot. Mills (S. C.) Pfd.	91	96
Langley Mfg. Co. (S. C.)	91	100
Laurens Cotton Mills (S. C.)	...	151
Limestone Mills (S. C.)	140	150
Lockhart Mills (S. C.)	...	91
Lockhart Mills (S. C.) Pfd.	97	100
Louise Mills (N. C.)	...	90
Marlboro Cotton Mills (S. C.)	85	88½
Mayo Mills (S. C.)	165	185
Mills Mfg. Co. (S. C.)	...	110
Mills Mfg. Co. (S. C.) Pfd.	105	111
Monaghan Mills (S. C.)	115	120
Monarch Cotton Mills (S. C.)	106	112
Newberry Cotton Mills (S. C.)	140	150
Norris Cotton Mills (S. C.)	120	121
Olympia Cot. Mills (S. C.) Pfd.	68	70
Orangeburg Cot. Mills (S. C.) Pfd.	80	98
Orr Cotton Mills (S. C.)	...	107
Pacolet Mfg. Co. (S. C.)	...	170
Pacolet Mfg. Co. (S. C.) Pfd.	101	103½
Pelzer Mfg. Co. (S. C.)	165	176
Piedmont Mfg. Co. (S. C.)	165	176
Poe Mfg. Co. (S. C.)	128	130
Raleigh Cotton Mills (N. C.)	100	105
Richland Cot. Mills (S. C.) Pfd.	...	55
Roanoke Mills (N. C.)	160	165
Saxon Mills (S. C.)	...	128
Sibley Mfg. Co. (Ga.)	63	65
Spartan Mills (S. C.)	...	146
Springstein Mills (S. C.)	...	100
Trion Mfg. Co. (Ga.)	...	127½
Tucapau Mills (S. C.)	200	...
Union-Buffalo Mills (S. C.) 1st Pfd.	67	69
Victor Mfg. Co. (S. C.)	128	130
Warren Mfg. Co. (S. C.)	92	93½
Warren Mfg. Co. (S. C.) Pfd.	105	...
Washington Mills (Va.)	20	25
Washington Mills (Va.) Pfd.	100	115
Whitney Mfg. Co. (S. C.)	...	125
Wiscassett Mills (N. C.)	115	120
Woodruff Cotton Mills (S. C.)	130	132½
Woodside Cotton Mills (S. C.)	...	110½

Quotations Furnished by William S. Glenn, Broker, Spartanburg, S. C., for Week Ending December 30.

	Bid.	Asked.
Abbeville Cotton Mills (S. C.)	85	90
Aetna Cotton Mills (S. C.) Pfd.	...	80
Aiken Mfg. Co. (S. C.)	82	89
American Spinning Co. (S. C.)	145	...
Anderson Cotton Mills (S. C.)	...	75
Arcadia Mills (S. C.)	98	101
Arkwright Cotton Mills (S. C.)	109	...
Augusta Factory (Ga.)	80	85
Avondale Mills (Ala.)	110	...
Belton Mills (S. C.)	115	122
Brandon Mills (S. C.)	125	130
Brogon Mills (S. C.)	40	45
Cabarrus Cotton Mills (N. C.)	125	...
Chadwick Mfg. Co. (N. C.) Pfd.	...	103
Chiquola Mfg. Co. (S. C.)	118	125
Clifton Mfg. Co. (S. C.)	110	115
Clifton Mfg. Co. (S. C.) Pfd.	...	101
Clinton Cotton Mills (S. C.)	155	...
Columbus Mfg. Co. (Ga.)	94	98
Courtenay Mfg. Co. (S. C.)	...	100
Dallas Mfg. Co. (S. C.)	95	100
Darlington Mfg. Co. (S. C.)	80	85
D. E. Converse Co. (S. C.)	112	...
Drayton Mills (S. C.)	...	107
Eagle & Phenix Mills (Ga.)	130	135
Easley Cotton Mills (S. C.)	145	150
Enoree Mfg. Co. (S. C.)	70	82
Enoree Mfg. Co. (S. C.) Pfd.	100	102
Enterprise Mfg. Co. (Ga.)	82	90
Exposition Cotton Mills (Ga.)	225	...
Gaffney Mfg. Co. (S. C.)	80	85
Gainesville Cotton Mills (Ga.)	57	60
Glenwood Mills (S. C.) Cotton	122	...
Gluck Mills (S. C.)	90	95
Granby Cot. Mills (S. C.) 1st Pfd.	50	...
Graniteville Mfg. Co. (S. C.)	160	165
Greenwood Cotton Mills (S. C.)	94	98
Grendel Mills (S. C.)	118	...
Hartsville Cotton Mill (S. C.)	120	130
Henrietta Mills (N. C.)	...	165
Inman Mills (S. C.)	100	102
King Mfg. Co., J. P. (Ga.)	97	103
Lancaster Cotton Mills (S. C.)	109	...
Lancaster Cot. Mills (S. C.) Pfd.	92	99
Langley Mfg. Co. (S. C.)	92	96
Laurens Mills (S. C.)	150	162
Limestone Mills (S. C.)	140	150
Lockhart Mills (S. C.)	90	95
Lockhart Mills (S. C.) Pfd.	...	101
Loray Cotton Mills (N. C.) Pfd.	90	100
Marlboro Cotton Mills (S. C.)	80	90
Mills Mfg. Co. (S. C.)	...	110
Mollohon Mfg. Co. (S. C.)	100	110
Monaghan Mills (S. C.)	117	...
Monarch Cotton Mills (S. C.)	105	109
Newberry Cotton Mills (S. C.)	127	...
Ninety-Six Cotton Mills (S. C.)	115	120
Norris Cotton Mills (S. C.)	117	122
Odell Mfg. Co. (N. C.)	...	90
Olympia Cotton Mills (S. C.)	70	80
Orr Cotton Mills (S. C.)	105	108
Pacolet Mfg. Co. (S. C.)	...	170
Pacolet Mfg. Co. (S. C.) Pfd.	101	104
Pelzer Mfg. Co. (S. C.)	167	175
Piedmont Mfg. Co. (S. C.)	170	...
Poe Mfg. Co., F. W. (S. C.)	125	135
Saxon Mills (S. C.)	124	128
Sibley Mfg. Co. (Ga.)	58	63
Spartan Mills (S. C.)	140	148
Trion Mfg. Co. (Ga.)	132	140
Tucapau Mills (S. C.)	195	...
Union-Buffalo (S. C.) 1st Pfd.	...	70
Union-Buffalo (S. C.) 2d Pfd.	20	27
Victor Mfg. Co. (S. C.)	130	...
Warren Mfg. Co. (S. C.)	90	97
Warren Mfg. Co. (S. C.) Pfd.	106	107
Washington Mills (Va.)	25	...
Washington Mills (Va.) Pfd.	100	105
Watts Mills (S. C.)	...	115
Whitney Mfg. Co. (S. C.)	...	150
Williamston Mills (S. C.)	105	...
Wiscassett Mills (N. C.)	127	...
Woodruff Cotton Mills (S. C.)	130	135
Woodside Cotton Mills (S. C.)	...	110

An Interesting Circular.

Spencer Trask & Co., bankers, William and Pine streets, New York, have issued a circular entitled "Investment Opportunities." It reviews the situation, and the firm says that the purpose of the publication is to afford the layman accurate information concerning the past and the present, that he may be better able to determine for himself the probable future course of prices in the investment markets, especially as to bonds. Several interesting comparative tables are presented, showing the low prices of bonds in various panics and their recovery in six-month and one-year periods thereafter. Another table shows the high prices of 35 well-known railroad bonds within the last two years and their low prices during the late panic. Statistics about the maximum rates for call money are also given.

New Corporations.

The Hyden Citizens' Bank of Hyden, Ky., is reported organized with $20,000 capital. Nashville people are said to be interested.

The Bank of Sugden has been chartered at Sugden, Okla., with $10,000 capital by R. L. Gibson, J. M. Alsabrook, L. E. Roberts and G. E. Cleaver.

A new State bank, it is reported, will be started at Winchester, Texas, by E. F. Brown, president of the Paige State Bank, Paige, Texas, and others.

The Cresson National Bank of Cresson, Texas, capital $25,000, has organized with F. O. Fidler, president; R. C. Kinder, vice-president, and C. C. Fidler, cashier.

The Guaranty Abstract Co. of Pauls Valley, Okla., has been incorporated with $10,000 capital by John P. McConahey, T. A. Vaughn and W. J. Thompson.

The National Bank of Miami, Okla., capital $25,000, has been approved. The organizers are R. J. Tuthill, Miami; C. P. Williams, C. M. Griffiths, John M. Cooper, C. J. Fribley and others.

The First National Bank of Maysville, Okla., has been approved; capital $25,000. The organizers are S. J. Garvin, Pauls Valley, Okla.; Tom Grout, Milas Lasater, David Mays, William Guthrim and W. P. Mays.

The Vernon Abstract Co. of Vernon, Texas, has been chartered with $5000 capital. The incorporators are R. L. More, E. L. McHugh, J. E. Lutz, F. L. Massie and W. B. Townsend.

The Bridgeport Bank & Trust Co. of Bridgeport, W. Va., has made application for a charter. The incorporators are C. A. Robinson, Fred Neininger, J. C. Heinlein, Dr. Andrew Heinlein, W. E. Beswick and Everly South.

The People's National Bank of West Alexander, W. Va., succeeding the banking house of Atkinson, McCleery & Co., has, it is reported, begun business; E. M. Atkinson of Elm Grove, president; W. B. Gilmore of West Alexander, cashier.

The Bond Guaranty Co., recently chartered at Dallas, Texas, has organized with Charles E. Brown, president, and R. L. Chapman, secretary and acting treasurer; capital $500,000. It will have quarters in the North Texas Building, 217 to 223 Main street.

A new bank is reported organized at Charleston, Miss., with $15,000 capital to begin business February 15. The directors are I. C. Pattison, president; J. R. Harris, vice-president; C. E. Harris, S. J. Baker and J. D. Sullivan. H. H. Womble is cashier.

The Bluefield Trust Co. of Bluefield, W. Va., has been chartered with $25,000 capital by R. D. Grimsley, York Coleman, J. E. Ritz, Bessie Godbey and Harold Ritz, all of Bluefield. Mr. Grimsley is presi-

[For Additional Financial News, See Pages 112 and 113.]